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EPA Superfund
Record of Decision:

NAVAL WEAPONS STATION EARLE (SITE A)
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COLTS NECK, NJ
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RECORD OF DECISION
OPERABLE UNIT 1 (OU-1)
SITES 4 AND 5

NAVAL WEAPONS STATION EARLE
Colts Neck, New Jersey

<IMG SRC 97084A>

Northern Division
Naval Facilities Engineering Command
Contract No. N62472-90-D-1298
Contract Task Order 279

AUGUST 1997

RECORD OF DECISION
NAVAL WEAPONS STATION EARLE
OPERABLE UNIT 1

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NAVAL WEAPONS STATION EARLE
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PART I - DECLARATION

I. SITE NAME AND LOCATION

Naval Weapons Station Earle
Colts Neck, Monmouth County, New Jersey

II. STATEMENT OF BASIS AND PURPOSE

This Record of Decision (ROD) presents the remedial action alternative selected for Operable Unit-1(OU-1), to address soil and groundwater contamination at the Naval Weapons Station (NWS) Earle Site, located in Colts Neck, New Jersey (Site). OU-1 includes the landfill west of "D" group (Site 4) and the landfill west of the Army barricades (Site 5), which were grouped together based on similarities of waste volumes, types of contaminants, and the potential for contaminants to migrate to human and/or environmental receptors.

This remedial action decision is in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA) and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). This decision document explains the factual and legal basis for selecting the remedial action and is based on the Administrative Record for OU-1. Reports and other information used in the remedy selection process are part of the Administrative Record file for OU-1, which is available at the Monmouth County Library, Eastern Brancht Route 35, Shrewsbury, New Jersey.

The New Jersey Department of Environmental Protection (NJDEP) has commented on the selected remedy, and their comments have been incorporated into this ROD. A review of the public response to the Proposed Plan is included in the Responsiveness Summary (Part III) of this decision document.

III. ASSESSMENT OF THE SITE

Pursuant to duly delegated authority, I hereby determine, pursuant to Section 106 of CERCLA, 42 U.S.C. º 9606, that actual or threatened releases of hazardous substances from OU-1, as discussed in Section VI (Summary of Site Risks) of this ROD, if not addressed by implementing the remedial action selected in this ROD, may present an imminent and substantial endangerment to public health, welfare, or the environment.

IV. DESCRIPTION OF THE SELECTED REMEDY

The Department of the Navy (Navy) and the United States Environmental Protection Agency (EPA), in consultation with the NJDEP, have selected the following remedy for OU-1, Sites 4 and 5. The remedy addresses capping of each landfill, institutional controls, and long-term groundwater monitoring. The selected remedy for Sites 4 and 5 includes the following major components:

1. Regrading of each landfill and installation of a cap over each landfill to reduce infiltration, promote drainage, limit erosion, and preclude potential contact with the landfill contents.

2. Establishing Classification Exception Areas (CEAs) immediately adjacent to the landfills to bar the use of groundwater during the remediation period.

3. Providing long-term periodic groundwater monitoring.

While the remedial action objective (RAO) for groundwater protection would not be immediately achieved, risks would be reduced in relation to background by the reduction of infiltration and continued monitoring to evaluate contaminant trends. Long-term periodic monitoring and analysis would determine when the RAO would

be achieved.

V. STATUTORY DETERMINATION

The selected remedy is protective of human health and the environment and is cost effective. The Navy and EPA believe that the selected remedy will comply with all Federal and State requirements that are legally applicable or relevant and appropriate to the remedial action. The selected remedy utilizes a permanent solution to the maximum extent practicable.

Because this remedy will result in hazardous substances remaining on site above health-based levels, a review by the Navy, EPA, and NJDEP will be conducted within five years after initiation of the remedial action to ensure that the remedy continues to provide adequate protection of human health and the environment.

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RECORD OF DECISION
NAVAL WEAPONS STATION EARLE
OPERABLE UNIT 1
SITES 4 AND 5

PART II - DECISION SUMMARY

I. SITE NAME, LOCATION, AND DESCRIPTION

A. General

NWS Earle is located in Monmouth County, New Jersey, approximately 47 miles south of New York City. The station consists of two areas, the 10,248-acre Main Base (Mainside area), located inland, and the 706-acre Waterfront area (Figure 1). The two areas are connected by a Navy-controlled right-of-way,

The facility was commissioned in 1943, and its primary mission is to supply ammunition to the naval fleet. An estimated 2,500 people either work or live at the NWS Earle station.

The Mainside area is located approximately 10 miles inland from the Atlantic Ocean at Sandy Hook Bay in Colts Neck Township, which has a population of approximately 6,500 people. The surrounding area includes agricultural land, vacant land, and low-density housing. The Mainside area consists of a large, undeveloped portion associated with ordnance operations, production, and storage; this portion is encumbered by explosive safety quantity distance arcs. Other land use in the Mainside area consists of residences, offices, workshops, warehouses, recreational space, open space, and undeveloped land. The Waterfront area is located adjacent to Sandy Hook Bay in Middletown Township, which has a population of approximately 68,200 people. The Mainside and Waterfront areas are connected by a narrow strip of land which serves as a government-controlled right of way containing a road and railroad.

Operable Unit 1 (OU-1) consists of two former landfills located in the Mainside area: the landfill west of "D" group (Site 4) and the landfill west of the Army barricades (Site 5)(Figure 2). The OU-1 sites were grouped together based on similarities of waste volumes, types of contaminants, and the potential for contaminants to migrate to human and/or environmental receptors. A brief description of each of these sites follows.

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B. Site 4: Landfill West of "D" Group

Site 4 is a 5-acre landfill that received approximately 10,200 tons of mixed domestic and industrial wastes from 1943 until 1960 (Figure 3). Disposed materials include metal scrap, construction debris, pesticide and herbicide containers, paint residues, and rinsewaters. It has been reported that containers of paint, paint thinners, varnishes, shellacs, acids, alcohols, caustics, and asbestos may have been disposed. The landfilled materials are currently covered by a thin layer of sandy soil.

C. Site 5: Landfill West of Army Barricades

This landfill received approximately 6,600 tons of mixed domestic and industrial wastes between 1968 and 1978 (Figure 4). Wastes included paper, glass, plastics, construction debris, pesticide and herbicide containers, containers of paint, paint thinners, varnishes, shellacs, acids, alcohols, caustics, and small amounts of asbestos. The landfilled materials are currently covered by a sand and vegetated soil layer ranging in depth from 1 to 3 feet. Approximately 1 acre of the site is used as a skeet shooting range.

II. SITE HISTORY AND ENFORCEMENT ACTIVITY

Potential hazardous substance releases at NWS Earle were addressed in an Initial Assessment Study (IAS) in 1982, a Site Inspection Study (SI) in 1986, and a Phase I Remedial Investigation (RI) in 1993. These were preliminary investigations to determine the number of sources, compile histories of waste-handling and disposal practices at the sites, and acquire data on the types of contaminants present and potential human health and/or environmental receptors. The RI investigation at Sites 4 and 5 included the installation and sampling of monitoring wells, collection of surface water and sediment samples, and excavation of test pits to observe wastes and sample subsurface soils.

In 1990, NWS Earle was placed on the National Priorities List (NPL), which is a list of sites where uncontrolled hazardous substance releases may potentially present serious threats to human health and the environment. The sites at NWS Earle were then addressed by Phase II RI activities to determine the nature and extent of contamination at these sites. Activities included installation and sampling of groundwater monitoring wells, surface water and sediment sampling, and surface and subsurface soil sampling. The Phase II RI was initiated in 1995 and completed in July 1996, when the final RI report was released.

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The results of the RI were used as the basis for performing a feasibility study (FS) of potential remedial alternatives. The Navy and EPA, in consultation with NJDEP, developed the proposed remedial action plan (Proposed Plan). The Proposed Plan is the basis for the selected remedial alternative presented in this ROD, and is based on the alternatives development from the FS, The RI, FS, Proposed Plan, and Community input are discussed in this ROD.

III. HIGHLIGHTS OF COMMUNITY PARTICIPATION

The documents that the Navy and EPA used to develop, evaluate, and select a remedial alternative for OU-1 have been maintained at the Monmouth County Library (Eastern Branch), Route 35, Shrewsbury, New Jersey.

The Feasibility Study Report, Proposed Plan, and other documents related to OU-1 were released to the public on March 21, 1997. The notice of availability of these documents was published in the Asbury Park Press on April 18, 20, and 21, 1997. A public comment period was held from March 21, 1997 to April 30, 1997.

A public meeting was held during the public comment period on April 24, 1997. At this meeting, representatives from the Navy and EPA were available to answer questions about OU-1 and the remedial alternatives under consideration. Results of the public comment period are included in the Responsiveness Summary, which is Part III of this ROD.

IV. SCOPE AND ROLE OF RESPONSE ACTION FOR OPERABLE UNIT 1

The Department of the Navy completed an RI, FS and Proposed Plan for OU-1, addressing contamination associated with Sites 4 and 5 at NWS Earle. These studies had shown that groundwater and soils in the areas of the former landfills had been contaminated with metals and low levels of organic solvent compounds. The final remedial action to address site contamination at each landfill is described in this document.

V. SUMMARY OF SITE CHARACTERISTICS

A. General

NWS Earle is located in the coastal lowlands of Monmouth County, New Jersey, within the Atlantic Coastal Plain Physiographic Province. The Mainside area, which includes OU-1, lies in the outer Coastal Plain, approximately 10 miles inland from the Atlantic Ocean. The Mainside area is relatively flat, with elevations ranging from approximately 100 to 300 feet above mean sea level (MSL). The most significant topographic relief within the Mainside area is Hominy Hills, a northeast-southwest-trending group of low hills located near the center of the station.

The rivers and streams draining NWS Earle ultimately discharge to the Atlantic Ocean, which is approximately

9 or 10 miles east of the Mainside area. The headwaters and drainage basins of three major Coastal Plain rivers (Swimming, Manasquan, and Shark) originate on the Mainside area. The northern half of the Mainside is in the drainage basin of the Swimming River, and tributaries include Mine Brook, Hockhockson Brook, and Pine Brook. The southwestern portion of the Mainside drains to the Manasquan River via either Marsh Bog Brook or Mingamahone Brook. The southeastern corner of the Mainside drains to the Shark River. Both the Swimming River and the Shark River supply water to reservoirs used for public water supplies.

NWS Earle is situated in the Coastal Plain Physiographic Province of New Jersey. The New Jersey Coastal Plain is a seaward-dipping wedge of unconsolidated Cretaceous to Quaternary sediments that were deposited on a pre-Cretaceous basement-bedrock complex. The Coastal Plain sediments are primarily composed of clay, silt, sand, and gravel and were deposited in continental, coastal, and marine environments. The sediments generally strike northeast-southwest and dip to the southeast at a rate of 10 to 60 feet per mile. The approximate thickness of these sediments beneath NWS Earle is 900 feet. The pre-Cretaceous complex consists mainly of PreCambrian and lower Paleozoic crystalline rocks and metamorphic schists and gneisses. The Cretaceous to Miocene Coastal Plain Formations are either exposed at the surface or subcrop in a banded pattern that roughly parallels the shoreline. The outcrop pattern is caused by the erosion truncation of the dipping sedimentary wedge. Where these formations are not exposed, they are covered by essentially flat-lying post-Miocene surficial deposits.

Groundwater classification areas were established in New Jersey under New Jersey Department of Environmental Projection (NJDEP) Water Technical Programs Groundwater Quality Standards in New Jersey Administrative Code (N.J.A.C.) 7:9-6. The Mainside area is located in the Class II-A: Groundwater Supporting Potable Water Supply area. Class II-A includes those areas where groundwater is an existing source of potable water with conventional water supply treatment or is a potential source of potable water. In the Mainside area, in general, the deeper aquifers are used for public water supplies and the shallower aquifers are used for domestic supplies.

OU-1 is situated in the recharge area of the Kirkwood-Cohansey aquifer system. The Kirkwood-Cohansey aquifer system is a source of water in Monmouth County and is composed of the generally unconfined sediments of the Cohansey Sand and Kirkwood Formation. The Kirkwood-Cohansey aquifer system has been reported in previous investigations as being used for residential wells in the Mainside area. Along the coast, this aquifer system is underlain by thick diatomaceous clay beds of the Kirkwood Formation.

All facilities located in the Mainside Administration area are connected to a public water supply (New Jersey American Water Company). Water for the public supply network comes from surface water intakes, reservoirs, and deep wells. No public water supply wells or surface water intakes are located on the NWS Earle facility. A combination of private wells and public water supply from the New Jersey American Water Company serves businesses and residences in areas surrounding the Mainside facilities. There are a number of private wells located within a 1-mile radius of NWS Earle and several within the NWS Earle boundaries. The majority of these wells are used for potable supplies; previous testing for drinking water parameters indicates these wells have not been adversely impacted.

There is a rich diversity of ecological systems and habitats at NWS Earle. Knieskern's beaked-rush (Rynchospora knieskemii), a sedge species on the federal endangered list has been seen on the station, and some species on the New Jersey endangered list such as the swamp pink (Helonias bullata), may be present. An osprey has visited Mainside and may nest in another area at NWS Earle. The Mingamahone Brook supports bog turtles downstream of the Mainside area and provides an appropriate habitat for them at the Mainside area.

B. Surface Water Hydrology

1. Site 4

Site 4 is an open area surrounded by woodlands. The ground surface slopes slopes downward to the southeast from approximately 170 feet above mean sea level (MSL near MW4-01 to approximately 150 feet above MSL at MW4-06. A broad, low-lying wetland extends from the eastern portion of Site 4 beyond the unpaved boundary road. Surface water flow is to the east and east-southeast toward the wetland.

2. Site 5

A small drainage ditch is located approximately 100 feet west of the dirt road that borders the western edge of the site, and water is present in the ditch only after periods of heavy rainfall. The closest surface water is a tributary of Hockhockson Brook, located approximately 1,000 feet east of Site 5. The site is located on the border of the Hockhockson Brook and Pine Brook watersheds. The topography of the site is flat, inhibiting off-site runoff, therefore, precipitation perches and infiltrates on the site. No surface seeps exist at the landfill.

C. Geology

1. Site 4

Regional mapping places Site 4 within the outcrop area of the Cohansey Sand. The Cohansey Sand ranges between 0 and 30 feet in thickness and the soil borings, are no more than 35 feet deep. The lithology of the sediments encountered in the on-site borings generally agrees with the published description of the Cohansey Sand. The thickness of the sediments penetrated in the on-site borings indicates the Cohansey Sand may have a regional thickness of greater than 30 feet. In general, the borings encountered alternating beds of light-colored, silty, fine- to coarse-grained sand with varying amounts of gravel. A 0.5-foot reddish-yellow clay seam was penetrated in one of the borings.

2. Site 5

Regional mapping places Site 5 within the outcrop area of the Kirkwood Formation. The Kirkwood Formation ranges between 60 and 100 feet in thickness. The lithology of the soils encountered in the on-site borings generally agrees with the published descriptions of the Kirkwood and Vincentown Formations. The on-site borings were no greater than 55 feet deep. Assuming a portion of the Kirkwood Formation was removed by erosion, it is possible that at least one of the soil borings penetrated the underlying Vincentown Formation. In general, the borings encountered brown and gray, very fine- to medium-grained sand and dark-colored silt (probably representative of the Kirkwood Formation) and olive and olive brown, slightly glauconitic, fine- to coarse-grained sand (probably representative of the Vincentown Formation). The Mainside area is located above the updip limit of the Piney Point Shark River, and Manasquan Formations; therefore, the glauconitic sand is interpreted to be part of the Vincentown Formation.

D. Hydrogeology

1. Site 4

Groundwater in the Cohansey aquifer beneath the site occurs under unconfined conditions. Static-water-level measurements and water-table elevations were recorded in August and October 1995.
Groundwater contour maps are presented in Figure 5 (August 1995) and Figure 6 (October 1995). The direction of shallow groundwater flow in the aquifer, as indicated by both the August and October groundwater elevations, is toward the east and east-southeast. There does not appear to be a significant seasonal variation in groundwater flow direction. The hydraulic conductivity calculated for MW4-04 is 4.48 x 10 -4 cm/sec (1.27 ft/day).

2. Site 5

Based upon the boring log descriptions, well MW5-06 penetrated the Kirkwood Formation, wells MW5-02, MW5-03, MW5-05, MW5-07, and MW5-08 penetrated both the Kirkwood and Vincentown Formations, and wells MW5-01 and MW5-4 penetrated the Vincentown Formation.

Groundwater in the Kirkwood and Vincentown aquifer beneath the site occurs under unconfined conditions and the formations are interpreted to be hydraulically interconnected. Groundwater contour maps are presented in Figure 7 (August 1995) and Figure 8 (October 1995). The direction of shallow groundwater flow in the aquifer is toward the northeast. There does not appear to be a significant seasonal variation in groundwater flow direction. The hydraulic conductivities calculated for MW5-02 (Kirkwood and Vincentown Formation), MW5-06

(Kirkwood Formation), and MW5-07 (Vincentown Formation) are 3.18 x 10 -4 cm/sec (0.90 ft/day), 6.46 x 10 -4 cm/sec (1.83 ft/day), and 2.08 x 10 -4 cm/sec (0.59 ft/day), respectively.

E. Nature and Extent of Contamination

1. Site 4

a. IAS and SI Results

The IAS determined that hazardous materials were potentially present and could impact groundwater. The SI detected low levels of volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), polychlorinated biphenyl (PCB), and metals in sediment samples receiving drainage from the site.

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b. Phase I Remedial Investigation

During the Phase I RI, groundwater samples showed VOCs, and subsurface soils showed elevated levels of a single pesticide and total petroleum hydrocarbons (TPH).

Six test pits were excavated to characterize the waste materials in the landfill. The waste consisted primarily of metal scrap such as steel banding, pipes, and empty metal trash barrels. Lumber, concrete, brick, and other construction debris were also encountered. No anomalous organic vapor readings were detected in any of the test pits.

c. Phase II Remedial Investigation

Results of the Phase II RI showed the presence of VOCs, including 1,2-dichloroethene (1,2-DCE) and trichloroethene (TCE), vinyl chloride (VC), and elevated levels of metals, including aluminum, iron, lead, and manganese in groundwater. Elevated levels of metals, including aluminum, iron, lead, and manganese, and trace levels of pesticides, including aldrin and dieldrin, were detected in surface water samples. A single SVOC, nitrobenzene, was also detected at an elevated level (66.0 ug/kg) in a sediment sample. Figure 9 depicts sample locations and concentrations of compounds that exceeded applicable or relevant and appropriate requirements (ARARs) and other guidance to be considered (TBCs). Table 1 summarizes the results of samples taken from groundwater compared to applicable standards.

Natural background levels of metals in local soils and groundwater were determined during the RI using samples obtained from locations chosen as being isolated from former or present industrial or military operations. In general, background sample locations were hydraulically upgradient or far removed from potential sources of contamination. In order to compare site-related groundwater metals concentrations found in a specific geologic formation to naturally ocurring (background) levels found in the similar distinct geological formation, some existing facility monitoring well sample results were selected for use as "background". All monitoring wells used in the calculation of background concentrations were deemed to have been installed in "background" locations (upgradient of RI sites). The Navy, EPA, and NJDEP collaborated in the selection of all background sample locations. The process of background concentration determination and statistical evaluation is presented in Section 31 of the RI report. Table 2 summarizes the range of background metals concentrations found in groundwater versus the range of concentrations found on site.

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TABLE 1
SITE 4 GROUNDWATER
NWS EARLE, COLTS NECK, NEW JERSEY

			ARARs and TBCs		Data Exceeding ARARs					
	Maximun Exceedances	Frequency of Eceedance	Maximun Contamination Level (MCL) (ug/L)	Drinking Water Health Advisory (Lowest) Coterion Shown)	NJDEP Groundwater Quality Standard (ug/L)	04GWO1 1995 RI 7/25/95	04GW02 1995 RI 7/26/95	04GW04 1995 RI 7/25/95	04GW05 1995 RI 7/25/95	04GW06 1995 RI 7/25/95	04GW07 1995 RI 8/22/95
INORGANICS (UG/L)											
ALUMINUM	2690	5/6	-	-	200	1590 J	923 J	1490 J	2690 J	578 J	
IRON	20900	4/8	-	-	300	554	20900		7680	647	
MANGANESE	306	1/6	-	-	50	306					
VOLATILES (UG/L)											
TRICHLOROETHENE	55	1/6	5	-	1				55		
VINYL CHLORIDE	3	1/6	2	10e	5		3				

J = Value is estimated because the concentration is below the laboratory contract quantitation limit or because of data validation control quality criteria.
e = The listed health advisory, long-term child, is equal to the most stringent of the EPA health advisories for this chemical.

Metals in groundwater were found at concentrations similar to background levels, although iron was detected in a downgradient well sample at a concentration greater than background and upgradient Levels. Compounds found in groundwater at concentrations greater than regulatory guidelines included aluminum, iron, and manganese. However, there is no promulgated federal regulatory standard for these common groundwater constituents. Also, as discussed in the RI report, some of the metals concentrations found in groundwater samples may be attributable to sample turbidity when the low-flow sampling technique did not achieve the sample collection endpoint turbidity goal. In the case of Site 4, of six monitoring well samples collected, only one met the sample collection endpoint turbidity goal and another came near the goal. The other four samples collected had relatively high endpoint turbidity values, indicating that metals concentration results may be biased high for groundwater samples collected at Site 4.

Organic compounds found in groundwater at levels above regulatory standards included trichloroethene and vinyl chloride, each in one monitoring well. Vinyl chloride was found at a concentration (3 ug/L) slightly above the federal (and state) standard for human consumption of groundwater (2 ug/L). Vinyl chloride was detected only during the RI Phase II sampling, not during any of the three rounds of RI Phase I sampling. The presence of 1,2-dichloroethene and vinyl chloride, both degradation products of TCE, found slightly above (VC) or below (1,2-DCE) the regulatory standard, indicates that contaminants leaching from the limited source area are degrading with time.

d. Groundwater Modeling

Computer modeling estimated that Site 4 groundwater metals concentrations would gradually diminish over a long period of time, assuming a source control measure, such as capping, would be implemented to control vertical migration. The model estimated that metals concentrations at the nearest potential discharge point, a stream located approximately 400 feet downgradient of Site 4, would be well below either the state standard or background levels. The maximum distance from Site 4 where metals concentrations in groundwater would remain above applicable regulatory standards or background Levels, was estimated to be 55 feet by the model. Surface water samples taken from the watershed downgradient of Site 4 currently show no concentration of compounds above background or regulatory standards.

TABLE 2
COMPARISON OF SITE-RELATED METALS CONCENTRATION IN GROUNDWATER
TO BACKGROUND CONCENTRATIONS - SITE 4
NWS EARLE, COLTS NECK, NEW JERSEY
(µg/L)

SUBSTANCE	BACKGROUND		SITE-RELATED		
	FREQUENCY OF DETECTION	RANGE OF POSITIVE DETECTION	FREQUENCY OF DETECTION	RANGE OF POSITIVE DETECTION	AVERAGE CONCENTRATION
ALUMINUM	11/11	287 - 7870	6/6	107 - 2690	1229
BARIUM	11/11	2.6 - 518	6/6	12.6 - 961	256
BERYLLIUM	4/11	0.21 - 1.6	2/6	0.75 - 1.6	0.4
CADMIUM	5/11	0.6 - 1.9	4/6	0.44 - 0.84	0.5
CALCIUM	11/11	506 - 17200	6/6	506 - 55000	11841
CHROMIUM	NOT DETECTED		3/6	1.3 - 5.4	1.8
COBALT	6/11	0.7 - 10.1	2/6	0.69 - 1.1	0.5
COPPER	9/11	0.79 - 13.5	6/6	1 - 18.3	5.6
IRON	11/11	153 - 7690	6/6	75.3 - 20900	5002
LEAD	3/11	2.1 - 3	3/6	2.4 - 3	1.7
MAGNESIUM	11/11	273 - 27400	6/6	273 - 22000	4436
MANGANESE	11/11	3.3 - 65	6/6	12.8 - 306	70
MERCURY	11/11	0.005 - 0.12	6/6	0.005 - 0.079	0.03
NICKEL	10/11	0.81 - 25.5	5/6	1 - 4.6	2.2
POTASSIUM	11/11	350 - 3245	6/6	350 - 9080	2214
SODIUM	11/11	1850 - 11650	6/6	2290 - 5210	3393
VANADIUM	10/11	0.69 - 42.25	1/6	7.1	1.4
ZINC	6/9	3.7 - 348	5/6	4 - 558	162

In summary, results of investigations at Site 4 indicate that

- Metals found in groundwater at concentrations above New Jersey regulatory standards were limited to aluminum, iron, and manganese. There is no promulgated federal regulatory standard for these common groundwater constituents.
- Metals concentration results may be biased high for groundwater samples collected at Site 4 because of high sample endpoint turbidity values in four of the six samples taken.
- Modeling estimated that metals in groundwater will migrate only very little, and concentrations will diminish slowly with time.

TCE found in one monitoring well at a concentration greater than the EPA and New Jersey standard, and its degradation products found approximately at (VC) or below (1,2-DCE) the regulatory standard, indicate that contaminants leaching from the limited source area are degrading with time and are not widely spread.

2. Site 5

a. IAS and SI Results

The IAS and SI concluded that a potential threat to groundwater existed at the site.

b. Phase I Remedial Investigation

The results of the Phase I RI showed metals and VOCs in subsurface soil and groundwater samples.

Four test pits were excavated to characterize the wastes that had been disposed at the landfill. A layer of trash, ranging in thickness from 6 to 13 feet was encountered in all four test pits. The trash consisted of foam rubber, glass, paper, plastic, metal scrap materials, lumber, concrete, bricks, and other construction debris.

C. Phase II Remedial Investigation

The Phase II RI indicated the presence of metals (e.g., aluminum, arsenic, cadmium, cobalt, iron) and VOCs [1,2-dichloroethane (1,2-DCA), 1,2-DCE, TCE, benzene, ethylbenzene, xylene, vinyl chloride] in groundwater samples, generally confirming previous findings. Figure 10 depicts sample locations and concentrations of compounds that exceeded ARARs and TBCs. Table 3 summarizes the results of samples taken from groundwater compared to applicable standards.

Natural background levels of metals in local soils and groundwater were determined during the RI using samples obtained from locations chosen as being isolated from former or present industrial or military operations. In general, background sample locations were hydraulically upgradient or far removed from potential sources of contamination. In order to compare site-related groundwater metals concentrations found in a specific geologic formation to naturally occurring (background) levels found in the similar distinct geological formation, some existing facility monitoring well sample results were selected for use as "background". All monitoring wells used in the calculation of background concentrations were deemed to have been installed in "background" locations (upgradient of RI sites). The Navy, EPA, and NJDEP collaborated in the selection of all background sample locations. The process of background concentration determination and statistical evaluation is presented in Section 31 of the RI report. Table 4 summarizes the range of background metals concentrations found in groundwater versus the range of concentrations found on site.

Metals, including aluminum, cadmium, cobalt chrormium, iron, manganese, and nickel, were found in groundwater at concentrations generally 1 to 1.5 times the corresponding background levels. Aluminum in one monitoring well was found at a concentration approximately six times the highest concentration found in a background groundwater sample. Beryllium was detected at a concentration greater than background but near the instrument detection limit in one monitoring well, and thallium was found in two upgradient well samples at

low levels, although it was not found in background.

Metals found in groundwater at concentrations greater than regulatory guidelines included aluminum, cadmium, iron, manganese, nickel, and thallium. In the case of Site 5, of eight monitoring well samples collected, four met the sample collection endpoint turbidity goal and the other four had reasonably low endpoint turbidity values, indicating no probable general correlation between turbidity and groundwater samples metals concentrations above regulatory standards or background.
Organic compounds found in groundwater at levels above regulatory standards included 1,2-DCA, benzene, chloroform, and TCE. All four compounds were found at concentrations below the federal standard for human consumption for potable water supplies, but slightly above the New Jersey standard. TCE and benzene were each found in two monitoring wells downgradient of the landfill. Chloroform was found in one monitoring well upgradient of the landfill at a concentration above the New Jersey standard.

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TABLE 3
SITE 5 GROUNDWATER
NWS EARLE, COLTS NECK, NEW JERSEY

			ARARs and TBCs		Data Exceeding ARARs					
	Maximum Exceedances	Frequency of Eceedance	Maximum Contamination Level (MCL) (ug/l)	Drinking Water Health Advisory (1) (Lowest Criterion Shown)	NJDEP Groundwater Quality Standard (ug/l)	05GW01 1995 RI 7/21/95	05GW02 1995 RI 7/07/95	05GW04 1995 RI 7/21/95	05GW05 1995 RI 7/5/95	05GW06 1995 RI 7/13/95	05GW07 1995 RI 8/22/95
INORGANICS (UG/L)											
ALUMINUM	42000	8/8	-	-	200	2150 J	4310	7870 J	2740	2600	497
CADMIUM	8	2/8	5	5e	4					7	
IRON	59200	8/8	-	-	300	2670	453	1450 J	2310	59200J	331
MANGANESE	302	4/8	-	-	50		65		171	156	
NICKEL	102	1/8	100	100a	100						
THALLIUM	6	3/8	2	0.4a	10	4			6 J		
VOLATILES (UG/L)											
1,2-DICHLOROETHANE	3	1/8	5	700e	2					3 J	
BENZANE	3	2/8	5	200d	1					2 J	
CHLOROFORM	22	1/8	100	100e	6	22					
TRICHLOROETHENE	4	2/8	5	-	1		3		55	4 J	

1. A Health Advisory is a concentration of a chemical in drinking water that is not expected to cause any adverse noncarcinogenic effects for up to specified period of time (days or years) of exposure with a margin of safety.
J = Value is estimated because the concentration is below the laboratory contract quantitation limit or because of data validation control quality criteria.
a = The listed health advisory criterion, lifetime adult (70 years), is equal to the most stringent of the EPA health advisories for this chemical.
d = The listed health advisory criterion, ten-day child (14 days), is equal to the most stringent of the EPA health advisories for this chemical.
e = The listed health advisory criterion, long-term child (7 years), is equal to the most stringent of the EPA health advisories for this chemical.

TABLE 4
COMPARISON OF SITE-RELATED METALS CONCENTRATION IN GROUNDWATER
TO BACKGROUND CONCENTRATIONS - SITE 5
NWS EARLE, COLTS NECK, NEW JERSEY
(Ig/L)

	BACKGROUND		SITE-RELATED		
SUBSTANCE	FREQUENCY OF DETECTION	RANGE OF POSITIVE DETECTION	FREQUENCY OF DETECTION	RANGE OF POSITIVE DETECTION	AVERAGE CONCENTRATION
ALUMINUM	11/11	287-7870	8/8	468-42000	7829
ARSENIC	1/11	5.8-5.8	1/8	5.3	2.1
BARIUM	11/11	2.6-518	8/8	11-65.5	30.8
BERYLLIUM	4/11	0.21-1.6	4/8	0.22-1.1	0.33
CADMIUM	5/11	0.6-1.9	7/8	0.51-7.5	2.5
CALCIUM	11/11	506-17200	8/8	855-10300	3893
CHROMIUM	NOT DETECTED		8/8	4.7-33.4	11.3
COBALT	6/11	0.7-10.1	5/8	3.8-29.6	7.8
COPPER	9/11	0.79-13.5	5/8	0.98-2	0.9
IRON	11/11	153-7690	8/8	331-59200	10316
LEAD	3/11	2.1-3	3/8	1.6-2.1	1.2
MAGNESIUM	11/11	273-27400	8/8	1170-6720	2792
MANGANESE	11/11	3.3-65	8/8	12.7-302	100
MERCURY	11/11	0.005-0.12	8/8	0.012-0.13	0.07
NICKEL	10/11	0.81-25.5	7/8	2.6-102	25.7
POTASSIUM	11/11	350-3245	8/8	945-2850	1753
SODIUM	11/11	1850-11650	8/8	3920-33300	8970
THALLIUM	3/11	4-5.1	3/8	3.9-5.6	3.0
VANDIUM	10/11	0.69-42.25	7/8	1.2-10.8	4.5

d. Groundwater Modeling

Computer modeling estimated that Site 5 groundwater metal concentrations would gradually diminish over a long period of time, assuming a source control measure, such as capping, would be implemented to control vertical migration. The model estimated that metals concentrations at the nearest potential discharge point, a stream located approximately 3,500 feet downgradient of Site 5, would be well below either the state standard or background levels. Surface water samples taken from the watershed downgradient of Site 5 currently show no concentrations of compounds above background or regulatory standards.

In summary, results of investigations at Site 5 indicate that

- Metals concentrations in groundwater were found to be slightly higher than background or the corresponding New Jersey standard (generally at 1 or 1.5 times the corresponding background concentration).
- Modeling estimates that metals in groundwater will migrate only very little, and concentrations will diminish slowly with time
- Thallium found at low concentrations in groundwater upgradient of the landfill does not appear to be leaching from the landfill.
- Source control (e.g., covering the landfill) would inhibit infiltration of water through the landfill, preclude the leaching of additional metals and volatiles, and promote natural attenuation. Long-term monitoring would be required to evaluate the effective new of source control.
- The low levels of 1,2-DCA and TCE found in groundwater downgadient of the landfill are indicative of contaminants leaching from a limited source area that are degrading with time and are not widely spread.
- The low level of chloroform found in one upgradient monitoring well does not appear to be the result of a concentrated source in the area of the landfill.

After significant investigation over more than a decade, no concentrated source of VOCs has been found at Site 5. It is unlikely that a concentrated source of VOC contamination exists in the landfilled material.

VI. SUMMARY OF SITE RISKS

As part of the Phase II RI, human health risk assessments and ecological risk assessments were performed at OU-1. A four-step process is utilized for assessing site-related human health risks for a reasonable maximum exposure scenario: Hazard Identification identifies the contaminants of concern at the site based on several factors such as toxicity, frequency of occurrence, and concentration. Exposure Assessment estimates the magnitude of actual and/or potential human exposures, the frequency and duration of these exposures, and the pathways (e.g., ingesting contaminated well-water) by which humans are potentially exposed. Toxicity Assessment determines the types of adverse health affects associated with chemical exposures, and the relationship between the magnitude of exposure (dose) and severity of adverse effects (response). Risk Characterization summarizes and combines outputs of the exposure and toxicity assessments to provide a quantitative assessment of site-related risks and includes a discussion of site-specific uncertainties such as actual receptor pathways, and receptor activity patterns.

A. Human Health Risks

The human health risk assessment estimated the potential risks to human health posed by exposure to contaminated groundwater, surface water and sediment, and surface and subsurface soils at the sites. To assess these risks, the exposure scenarios listed below were assumed:

- Ingestion of groundwater as a drinking water source

- Inhalation of contaminants in groundwater (i.e., volatile compounds emitted during showering)
- Dermal exposure to contaminants in groundwater (i.e., showering, hand washing, bathing)
- Dermal contact from contaminated soils
- Inhalation of contaminants in soil (i.e., fugitive dusts)
- Incidental ingestion of contaminated soils
- Incidental ingestion of surface water and sediment
- Dermal contact with contaminated surface water or sediment

These scenarios were applied to various site use categories, including current industrial use, future industrial use, future lifetime resident and future recreational child.

Potential human health risks were categorized as carcinogenic or noncarcinogenic. A hypothetical carcinogenic risk increase from exposure should ideally fall below a risk range of 1 x 10 -6 (an increase of one case of cancer for one million people exposed) to 1 x 10 -4 (an increase of one case of cancer per 10,000 people exposed).

Noncarcinogenic risks were estimated using Hazard Indices (HI), where an HI exceeding one is considered an unacceptable health risk.

In addition, results were compared to applicable federal and/or state standards such as federal Maximum Contaminant Levels (MCLs) for drinking water, New Jersey Department of Environmental Protection (NJDEP) Groundwater Quality Standards (GWQS), or other published lists of reference values.

A baseline human health risk assessment was conducted for the OU-1 sites. Results of this assessment are discussed for each site.

1. Site 4

The cancer risk associated with future residential exposure from groundwater at Site 4 was conservatively estimated at 1 X 10 -4 which is the upper end of the acceptable risk range (Tables 5 and 6). This value is primarily attributable to vinyl chloride, which was detected in one sample. His for the future residential exposure by groundwater exceeded 1.0, primarily due to barium and iron (Tables 5 and 6).

TABLE 5
SUMMARY OF ESTIMATED RME CANCER RISKS AND NONCARCINOGENIC HAZARD INDICIES - SITE 4
NWS EARLE, COLTS NECK, NEW JERSEY

		Estimated Incremental Cancer Risk				Estimated Hazard Index***				
Medium	Exposure Routes	Current Industrial Employee	Future Industrial Employee	Future Lifetime Resident	Future Recreational Child	Current Industrial Employee	Future Industrial Employee	Future Resident Child	Future Resident Adult	Future Recreational Child
Surface Soil	Incidental Ingestion	N/S	N/A	N/S	N/A	N/S	N/A	N/S	N/A	N/A
	Dermal Contact	N/S	N/A	N/S	N/A	N/S	N/A	N/S	N/A	N/A
	Inhalation of Fugitive Dust	N/S	N/A	N/S	N/A	N/S	N/A	N/S	N/A	N/A
Subsurface Soil	Incidental Ingestion	N/A	N/S	N/S	N/A	N/A	N/S	N/S	N/A	N/A
	Dermal Contact	N/A	N/S	N/S	N/A	N/A	N/S	N/S	N/A	N/A
	Inhalation of Fugitive Dust	N/A	N/S	N/S	N/A	N/A	N/S	N/S	N/A	N/A
Sediment	Incidental Ingestion	N/A	N/A	N/A	1.3E-08	N/A	N/A	N/A	N/A	1.0E-03
	Dermal Contact	N/A	N/A	N/A	5.6E-10	N/A	N/A	N/A	N/A	8.6E-04
Groundwater	Ingestion	N/A	4.5E-05	9.0E-05^	N/A	N/A	6.0E-01	3.1E+00@	N/A	N/A
	Dermal Contact	N/A	1.1E-06	4.1E-06^	N/A	N/A	5.7E-03	1.7E-01^	N/A	N/A
	Inhalation of Volatiles*	N/A	N/A	2.1E-05^	N/A	N/A	N/A	N/A	N/A**	N/A
Surface Water	Incidental Ingestion	N/A	N/A	N/A	9.1E-08	N/A	N/A	N/A	N/A	3.3E-02
	Dermal Contact	N/A	N/A	N/A	1.5E-07	N/A	N/A	N/A	N/A	4.0E-02
	TOTAL	-	4.6E-05	1.2E-04	2.6E-07	-	6.1E-01	3.3E+00	-	7.4E-02

N/A = Not applicable because this media is not associated with this potential receptor
N/S = Not sampled
* = During Showering, Adult Residents Only
** = No volatile noncarcinogens were detected in groundwater
*** = Hazard Indicies (i.e., summation of hazard quotients) are used only for comparison purposes and do not reflect actual additive noncercinagenic effects
^ = Value from amended risk assessment
@ = Result is the maximum of the HIs among the affected target organs from the amended risk assessment.

TABLE 6
SUMMARY OF CENTRAL TENDENCY CANCER RISKS AND NONCARCINOGENIC HAZARD INDICIES - SITE 4
NWS EARLE, COLTS NECK, NEW JERSEY

		Estimated Incremental Cancer Risk				Estimated Hazard Index***				
Medium	Exposure Routes	Current Industrial Employee	Future Industrial Employee	Future Lifetime Resident	Future Recreational Child	Current Industrial Employee	Future Industrial Employee	Future Resident Child	Future Resident Adult	Future Recreational Child
Surface Soil	Incidental Ingestion	N/S	N/A	N/S	N/A	N/S	N/A	N/S	N/A	N/A
	Dermal Contact	N/S	N/A	N/S	N/A	N/S	N/A	N/S	N/A	N/A
	Inhalation of Fugitive Dust	N/S	N/A	N/S	N/A	N/S	N/A	N/S	N/A	N/A
Subsurface Soil	Incidental Ingestion	N/A	N/S	N/S	N/A	N/A	N/S	N/S	N/A	N/A
	Dermal Contact	N/A	N/S	N/S	N/A	N/A	N/S	N/S	N/A	N/A
	Inhalation of Fugitive Dust	N/A	N/S	N/S	N/A	N/A	N/S	N/S	N/A	N/A
Sediment	Incidental Ingestion	N/A	N/A	N/A	N/R	N/A	N/A	N/A	N/A	N/R
	Dermal Contact	N/A	N/A	N/A	N/R	N/A	N/A	N/A	N/A	N/R
Groundwater	Ingestion	N/A	N/R	1.3E-05^	N/A	N/A	N/R	1.4E+00@	N/A	N/A
	Dermal Contact	N/A	N/R	6.5E-07^	N/A	N/A	N/R	1.1E-01^	N/A	N/A
	Inhalation of Volatiles*	N/A	N/A	1.2E-06^	N/A	N/A	N/A	N/A	N/A**	N/A
Surface Water	Incidental Ingestion	N/A	N/A	N/A	N/R	N/A	N/A	N/A	N/A	N/R
	Dermal Contact	N/A	N/A	N/A	N/R	N/A	N/A	N/A	N/A	N/R
	TOTAL	-	-	1.5E-05	-	-	-	1.5E+00	-	-

N/A = Not applicable because this media is not associated with this potential receptor
N/S = Not sampled
N/R = Central Tendency calculation not required
* = During Showering, Adult Residents Only
** = No volatile noncarcinogens were detected in groundwater
*** = Hazard Indicies (i.e., summation of hazard quotients) are used only for comparison purposes and do not reflect actual additive noncercinagenic effects
^ = Value from amended risk assessment
@ = Result is the maximum of the HIs among the affected target organs from the amended risk assessment.

Sample results also show that several metals (aluminum, iron, manganese) and VOCs (1,2-DCE and vinyl chloride) exceed applicable groundwater standards.

2. Site 5

The cancer risk associated with future residential exposure from groundwater at Site 5 was calculated to be approximately 1.3 X 10 -4 which is the upper end of the acceptable risk range (Tables 7 and 8). This value is primarily due to arsenic and vinyl chloride, detected in groundwater samples (although both were only detected in one well at levels at or below EPA and New Jersey Standards). In addition, the noncarcinogenic HI also exceeded the acceptable risk level of 1.0, due to iron (Tables 7 and 8).

Contaminants detected in Site 5 groundwater samples that exceeded standards include aluminum, cadmium, iron, manganese, nickel, thallium, 1,2-DCA, benzene, chloroform, and TCE.

B. Ecological Risks

The ecological risk assessment estimates the risk posed to ecological receptors, such as aquatic and terrestrial biota, from contamination at the NWS Earle sites.

A summary of the results of the ecological risk assessment for the OU-1 sites is presented below:

1. Site 4

The ecological risk assessment concluded that contaminants do not appear to be significantly migrating to surface water and sediments in the wetlands via overland runoff and/or groundwater to surface water discharge.

2. Site 5

Off-site migration of contaminants to the surrounding wetland areas, upland areas, and Hockhockson Brook or Pine Brook watersheds via overland runoff and/or groundwater to surface water discharge is limited. Some metals pose moderate risk at the levels present. However, the presence of cover material at the landfill and the fact that the extensive vegetation on the site does not appear to be adversely impacted indicate that the potential for adverse ecological effects is low.

TABLE 7
RME CARCINOGENIC RISK TO FUTURE RESIDENTIAL RECEPTORS - SITE 5
GROUNDWATER, AMENDED-RISK
NWS EARLE, COLTS NECK, NEW JERSEY

SUBSTANCE	GROUNDWATER INGESTION - LIFETIME	GROUNDWATER DERMAL CONTACT - LIFETIME	INHALATION OF VOAS IN GW - ADULT
1,2-DICHLOROETHANE	4.1E-06	1.5E-07	3.8E-06
1,2-DICHLOROETHENE(TOTAL)	N/A	N/A	N/A
BENZENE	1.3E-06	1.7E-07	1.5E-06
CHLOROFORM	1.0E-06	7.3E-08	1.3E-05
ETHYLBENZENE	N/A	N/A	N/A
METHYLENE CHLORIDE	2.2E-07	6.4E-09	5.3E-08
TRICHLOROETHENE	6.5E-07	9.3E-08	3.5E-07
VINYL CHLORIDE	5.7E-05	2.3E-06	1.2E-05
XYLENE (TOTAL)	N/A	N/A	N/A
ALUMINUM	N/A	N/A	N/A
ARSENIC	6.5E-05	1.6E-07	N/A
CADMIUM	N/A	N/A	N/A
COBALT	N/A	N/A	N/A
IRON	N/A	N/A	N/A
NICKEL	N/A	N/A	N/A
TOTAL RISK	1.3E-04	2.9E-06	3.0E-05

N/A = NOT APPLICABLE, NO TOXICITY VALUE HAS BEEN ESTABLISHED FOR THIS CHEMICAL

TABLE 8
CENTRAL TENDENCY CARCINOGENIC RISK TO FUTURE RESIDENTIAL RECEPTORS - SITE 5
GROUNDWATER, AMENDED RISK
NWS EARLE, COLTS NECK, NEW JERSEY

SUBSTANCE	GROUNDWATER INGESTION - LIFETIME	GROUNDWATER DERMAL CONTACT - LIFETIME	INHALATION OF VOAS IN GW - ADULT
1,2-DICHLOROETHANE	5.8E-07	2.4E-08	2.2E-07
1,2-DICHLOROETHENE(TOTAL)	N/A	N/A	N/A
BENZENE	1.9E-07	2.6E-08	8.7E-08
CHLOROFORM	1.4E-07	1.2E-08	7.4E-07
ETHYLBENZENE	N/A	N/A	N/A
METHYLENE CHLORIDE	3.2E-08	1.0E-09	3.0E-09
TRICHLOROETHENE	9.4E-08	1.5E-08	2.0E-08
VINYL CHLORIDE	8.1E-06	3.6E-07	6.7E-07
XYLENE (TOTAL)	N/A	N/A	N/A
ALUMINUM	N/A	N/A	N/A
ARSENIC	9.4E-06	2.1E-08	N/A
CADMIUM	N/A	N/A	N/A
COBALT	N/A	N/A	N/A
IRON	N/A	N/A	N/A
NICKEL	N/A	N/A	N/A
TOTAL RISK	1.9E-05	4.6E-07	1.7E-06

N/A - NOT APPLICABLE, NO TOXICITY VALUE HAS BEEN ESTABLISHED FOR THIS CHEMICAL

VII. REMEDIAL ACTION OBJECTIVES (RAOs)

The overall objective for the remedy at OU-1 Sites 4 and 5 is to protect human health and the environment. The RAO to protect human health is to prevent human exposure to landfilled material and to VOC and metal contamination in groundwater in the area immediately downgradient of the former landfills. Because continued leaching of landfill contaminants may degrade groundwater underlying Sites 4 and 5, the RAOs for protection of the environment are to minimize contaminant migration into groundwater and restoration of the aquifer to the applicable standards.

VIII. DESCRIPTION OF REMEDIAL ACTION ALTERNATIVES

The purpose of the alternative development and screening process is to assemble an appropriate range of possible remedial options to achieve the RAOs identified for the sites. In this process, technically feasible technologies are combined to form remedial alternatives that provide varying levels of risk reduction that comply with federal (EPA) and state (NJDEP) guidelines for site remediation.

In the case of former landfill sites, like Site 4 and Site 5, EPA has undertaken the presumptive remedies initiative to speed up selection of remedial actions. Based on the expectation that containment would generally be appropriate for municipal landfill waste (such as that found at Sites 4 and 5) and because the volume and heterogeneity of the waste generally make treatment impracticable, EPA established containment as the presumptive remedy. The presumptive remedy process was applied to Sites 4 and 5.

Engineering technologies capable of eliminating the unacceptable risks associated with exposure to site-related soils, sediments, or groundwater were identified, and those alternatives determined to best meet RAOs after screening were evaluated in detail. Tables 9 and 10 present the considered alternatives and the results of preliminary screening.

A. Detailed Summary of Alternatives

Summaries of the remedial alternatives developed for OU-1 Sites 4 and 5 are presented in the following sections.

TABLE 9
SITE 4 - SCREENING OF REMEDIAL ALTERNATIVES
NWS EARLE, COLTS NECK, NEW JERSEY

	ALTERNATIVE	EFFECTIVENESS	IMPLEMENTABILITY	COST		COMMENTS
1	No Action: (Long-TermPeriodic Monitoring, 5-year reviews)	Provides no additional protection of human health or the environment. Does not reduce potential for human exposure to landfill or groundwater contaminants. Does not reduce contaminant migration in the environment. No reduction in toxicity, mobility, or volume, of contaminants.	Readily implementable No technical or administrative difficulties.	Capital: O&M:	none low	Retained as baseline alternative in accordance with NCP.
2	Limited Action (institutional controls, access restrictions, long-term periodic monitoring. 5-year reviews)	Provides little added protection of human health through fencing and Institutional controls. Groundwater use would be restricted. Does not reduce contaminant migration to the environment. No reduction in toxicity, mobility, or volume of contaminants.	Readily Implementable. No technical or administrative, difficulties.	Capital: O&M:	none low	Relative to alternative 1, provides minimal additional protectiveness for additional cost. Eliminated.
3	Capping, Institutional Controls, and Long-Term Periodic Monitoring	Protects human health and the environment. Capping contaminated landfill materials prevent direct contact exposure and minimizes & contaminant migration to the environment. Groundwater use would be restricted. Groundwater contaminants will natutally attenuate over time. No reduction of toxicity or volume of contaminants	Readily implementable. No technical or administrative difficulties. Personnel and materials necessary to implement alternative are widely available.	Capital: O&M:	moderate moderate	Retained.

TABLE 10
SITE 5 - SCREENING OF REMEDIAL ALTERNATIVES
NWS EARLE, COLTS NECK, NEW JERSEY

	ALTERNATIVE	EFFECTIVENESS	IMPLEMENTABILITY	COST		COMMENTS
1	No Action: (Long-Term Periodic Monitoring, 5-year reviews)	Provides no additional protection of human health or the environment. Does not reduce potential for human exposure to landfill or groundwater contaminants. Does not reduce contaminant migration in the environment. No reduction in toxicity, mobility, or volume, of contaminants.	Readily implementable No technical or administrative difficulties.	Capital: O&M:	none low	Retained as baseline alternative in accordance with NCP.
2	Limited Action (institutional controls, access restrictions, long-term periodic monitoring. 5-year reviews)	Provides little added protection of human health through fencing and Institutional controls. Groundwater use would be restricted. Does not reduce contaminant migration to the environment. No reduction in toxicity, mobility, or volume of contaminants.	Readily Implementable. No technical or administrative, difficulties.	Capital: O&M:	none low	Relative to alternative 1, provides minimal additional protectiveness for additional cost. Eliminated.
3	Capping, Institutional Controls, and Long-Term Periodic Monitoring	Protects human health and the environment. Capping contaminated landfill materials prevent direct contact exposure and minimizes & contaminant migration to the environment. Groundwater use would be restricted. Groundwater contaminants will natutally attenuate over time. No reduction of toxicity or volume of contaminants	Readily implementable. No technical or administrative difficulties. Personnel and materials necessary to implement alternative are widely available.	Capital: O&M:	moderate moderate	Retained.

1. Site 4 Remedial Alternatives

a. Alternative 1: No Action

The no-action alternative was developed as a baseline to which other alternatives may be compared, as required by the NCP. No remedial actions would be taken to protect human health or the environment under this alternative. The purpose of this alternative is to evaluate the overall human health and environmental protection provided by the site in its present state. Periodic reviews of site conditions and long-term periodic monitoring of groundwater, surface water, and sediments would be conducted under this alternative.

b. Alternative 2: Limited Action

This alternative was developed as an option that relies on access restrictions and institutional controls to limit exposure to contaminants. This alternative does not employ treatment or containment to address site contamination.

Restrictions would be attached to the property title and/or the Base Master Plan (access restrictions) to limit future uses of the site that may result in disturbance of the existing soil cover or direct contact with contaminated media. A fence would be erected around the landfill to limit access to the site, to restrict human contact with contaminated landfill materials, and to protect the integrity of the existing cover.

Long-term, periodic monitoring would be conducted to assess contaminant status and potential threats to human health and the environment. Site conditions and risks would be reviewed every 5 years, since wastes would be left in place.

Because site groundwater does not meet New Jersey groundwater quality standards, a CEA pursuant to New Jersey Administrative Code (N.J.A.C) 7:9-6 would be established to provide the state official notice that the constituent standards would not be met for a specified duration and to ensure that use of groundwater in the affected area (immediately adjacent to the landfill, near well MW5-06) would be suspended until standards are achieved.

C. Alternative 3: Capping, Institutional Controls, and Long-Term Monitoring

This alternative is a containment option that uses a landfill cover system (capping) and institutional controls to prevent potential human exposure to contaminated soils and landfilled materials and minimize potential contaminant leaching into groundwater. Over time, the contaminants in groundwater would likely attenuate naturally through chemical and biological degradation (VOCs only) and physical and chemical processes (metals and VOCs). Metals concentrations in groundwater may decrease as a result of reduced infiltration of precipitation through landfill materials.

A low-permeability cover system that complies with federal and state regulatory requirements would be used to prevent potential human and animal contact with contaminants in landfill materials, limit contaminant leaching to groundwater, and minimize contaminant migration via surface runoff and erosion.

After construction, the cap would be maintained as needed. Institutional controls would be enacted to limit future uses of the site that may result in disturbance of the soil cover or direct contact with contaminated media and to prohibit use of untreated contaminated groundwater.

Long-term, periodic monitoring would be conducted to assess contaminant status and potential threats to human health and the environment. Site conditions and risks would be reviewed every 5 years since wastes would be left in place.

Because site groundwater does not meet New Jersey groundwater quality standards, a CEA pursuant to N.J.A.C. 7:9-6 would be established to provide the state official notice that the constituent standards would not be met for a specified duration and to ensure that use of groundwater in the affected area (immediately adjacent to the landfill, near wells MW4-02 and MW4-05) is suspended until standards are achieved.

2. Site 5 Remedial Alternatives

a. Alternative 1: No Action

The no-action alternative was developed as a baseline to which other alternatives may be compared, as required by the NCP. No remedial actions would be taken to protect human health or the environment. The purpose of this alternative is to evaluate the overall human health and environmental protection provided by the site in its present state. Periodic reviews of site conditions and long-term periodic monitoring of groundwater would be conducted under this alternative.

b. Alternative 2: Limited Action

This alternative was developed as an option that relies on access restrictions and institutional controls to limit exposure to contaminants. This alternative does not employ treatment or containment to address site contamination.

Restrictions would be attached to the property title and/or the Base Master Plan (access restrictions) to limit future uses of the site that may result in disturbance of the existing soil cover or direct contact with contaminated media. A fence would be erected around the landfill to limit access to the site, to restrict human contact with contaminated landfill materials, and to protect the integrity of the existing cover. Because the current and intended use of the eastern portion of the landfill is as a skeet and shooting range, access to the site would be limited to authorized persons but would not be prohibited.

Long-term, periodic monitoring would be conducted to assess contaminant status and potential threats to human health and the environment. Site conditions and risks would be reviewed every 5 years since wastes would be left in place.

Because site groundwater does not meet New Jersey groundwater quality standards, a CEA pursuant to N.J.A.C 7:9-6 would be established to provide the state official notice that the constituent standards would not be met for a specified duration and to ensure that use of groundwater in the affected area (immediately adjacent to the landfill, near well MW5-06) would be suspended until standards are achieved.

C. Alternative 3: Capping, Institutional Controls, and Long-Term Monitoring

This alternative is a containment option that utilizes capping and institutional controls to prevent potential human exposure to contaminated soils and landfilled materials and minimize further contaminant leaching into groundwater. A low-permeability cover would be constructed over former active landfill areas of the landfill. Over time, the contaminants in groundwater would likely attenuate naturally through chemical and biological degradation (VOCs only) and physical and chemical processes (metals and VOCs). Concentrations of metals in groundwater might decrease as a result of reduced infiltration of precipitation through landfilled materials.

For the new cap, a simple cover system that complies with federal and state regulatory requirements would be used to prevent potential human and animal contact with contaminants in landfill materials, limit contaminant leaching to groundwater, and minimize contaminant migration via surface runoff and erosion. The, new cap would be periodically maintained. Institutional controls would be enacted to limit future uses of the site that might result in disturbance of the new cap or direct contact with contaminated media and to prohibit use of untreated contaminated groundwater.

Long-term, periodic monitoring would be conducted to assess contaminant status and potential threats to human health and the environment. Site conditions and risks would be reviewed every 5 years since wastes would be left in place.

Because site groundwater does not meet New Jersey groundwater quality standards, a CEA pursuant to N.J.A.C 7:9-6 would be established to provide the state official notice that the constituent standards would not be met for a specified duration and to ensure that use of groundwater in the affected area (immediately adjacent to the landfill, near well MW5-06) would be suspended until standards are achieved.

IX. SUMMARY AND COMPARATIVE ANALYSIS OF ALTERNATIVES

The remedial action alternatives described in Section VIII were evaluated using the following criteria, established by the NCP:

Threshold Criteria: Statutory requirements that each alternative must satisfy in order to be eligible for selection.

1. Overall protection of human health and the environment - draws on the assessments conducted under other evaluation criteria and considers how the alternative addresses site risks through treatment, engineering, or institutional controls.

2. Compliance with ARARs - evaluates the ability of an alternative to meet Applicable or Relevant and Appropriate Requirements (ARARs) established through Federal and State statutes and/or provides the basis for invoking a waiver.

Primary Balancing Criteria: Technical criteria upon which the detailed analysis is primarily based.

3. Long-term effectiveness and permanence - evaluates the ability of an alternative to provide long-term protection of human health and the environment and the magnitude of residual risk posed by untreated wastes or treatment residuals.

4. Reduction of mobility, toxicity, or volume through treatment - evaluates an alternative's ability to reduce risks through treatment technology.

5. Short-term effectiveness - addresses the cleanup time frame and any adverse impacts posed by the alternative during the construction and implementation phase, until cleanup goals achieved.

6. Implementability - is an evaluation of technical feasibility, administrative feasibility, and availability of services, and material required to implement the alternative.

7. Cost - includes an evaluation of capital costs, annual operation and maintenance (O&M) costs.

Modifying Criteria: Criteria considered throughout the development of the preferred remedial alternative and formally assessed after the public comment period, which may modify the preferred alternative.

8. Agency acceptance indicates the EPA's and the State's response to the alternatives in term as of technical and administrative issues and concerns.

9. Community acceptance evaluates the issues and concerns the public may have regarding the alternatives.

The remedial alternatives were compared to one another based on the nine selection criteria, to identify differences among the alternatives and discuss how site contaminant threats are addressed.

A. Site 4

Based on the initial screening of remedial alternatives, Alternatives 1 and 3 were retained for further consideration. A detailed review of Alternatives 1 and 3 is included in this section and summarized in Table 11.

1. Overall Protection of Human Health and the Environment

Only Alternative 3 would be protective of human health and the environment. Because no actions are conducted, Alternative 1 would not reduce human health or ecological risk and would not reduce contaminant migration to the environment. Because no actions would be taken under Alternative 1 to contain contaminants or prevent deterioration of the landfill surface, health risks and adverse impacts to the environment would

be expected to remain the same over time.

Alternative 3 is protective of human health and the environment. The proposed cover system would reduce human health and ecological risks posed by the potential for contact with landfilled materials and would reduce leaching of contaminants to groundwater, thereby reducing contaminant migration into the environment. Routine maintenance of the landfill cover system would ensure its long-term protectiveness. Institutional controls would provide assurance that untreated contaminated groundwater is not used as a potable water source in the future.

2. Compliance with ARARs

Because Alternative 1 does not include any remedial actions, it would not comply with state and federal ARARs pertaining to post-closure of municipal landfills. Alternative 3 would comply with these requirements since a cover system would be installed and a long-term maintenance and repair program would be implemented.

Both alternatives would comply with federal and state long-term periodic monitoring requirements through the monitoring and evaluation of groundwater, surface water, and sediments.

Initially, periodic monitoring would be performed on a quarterly basis. If Parameters are stable or contaminant concentrations are found to be decreasing, then a reduced frequency of sampling would be warranted.

TABLE 11
SITE 4 - COMPARATIVE ANALYSIS OF REMEDIAL ACTION ALTERNATIVES
NWS EARLE, COLTS NECK, NEW JERSEY

CRITERION:	ALTERNATIVE 1: NO ACTION	ALTERNATIVE 3: CAPPING, INSTITUTIONAL CONTROLS, NATURAL ATTENUATION, AND LONG-TERM MONITORING
OVERALL PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT		
Prevent Human Exposure to Contaminated Soils and Landfilled Materials	No action taken to prevent human exposure to contaminated soils and landfilled materials. Existing risks would remain. Continued deterioration of the landfill surface would expose more contaminated soils and landfilled materials and result in increased direct exposure risks.	Enhanced cover system would prevent direct contact with contaminated soils and landfilled materials. Current direct contact risks were not quantified, but it is conservatively assumed that landfilled materials may pose excess health risks. Any excess risks would be reduced to acceptable levels by installing and maintaining the cap.
Prevent Human Exposure to VOC and Metal Contaminants in Groundwater	No action taken to prevent human exposure to contaminated groundwater. Carcinogenic and non-carcinogenic risks exceeding EPA's target risk range would remain. No actions taken to reduce contaminant leaching to groundwater. No institutional controls implemented to prohibit use of untreated groundwater for drinking water.	Institutional controls would minimize potential exposure to site groundwater by prohibiting its use. The cover system would reduce leaching of contaminants to groundwater, facilitating natural attenuation of contaminants. In time, contaminant concentrations would reach levels that would not pose excess risk.
Minimize Contaminant Migration	No actions taken to reduce contaminant leaching to groundwater. Contaminants would continue to leach into groundwater and migrate downgradient, potentially affecting downgradient receptors.	The cover system would reduce leaching of contaminants to groundwater and would reduce migration of contaminants to the environment by surface water and wind erosion.
COMPLIANCE WITH ARARs		
Chemical-Specific ARARs	Would not comply with state groundwater quality standards.	Groundwater contaminant concentrations would initially exceed state GWQC; over time GWQC would be achieved by natural attenuation. A classification exception area (CEA) would be established to provide the state official notification that standards would not be met for a specified duration.

TABLE 11
SITE 4 - COMPARATIVE ANALYSIS OF REMEDIAL ALTERNATIVES
NWS EARLE, COLTS NECK, NEW JERSEY

CRITERION:	ALTERNATIVE 1: NO ACTION	ALTERNATIVE 3: CAPPING, INSTITUTIONAL CONTROLS, NATURAL ATTENUATION, AND LONG-TERM MONITORING
Location-Specific ARARs	Not Applicable.	Would comply with federal and state ARARs for wetlands, floodplains, and other sensitive receptors.
Action-Specific ARARs	Would not comply with federal or state ARARs for post-closure maintenance of municipal landfills.	Would comply with federal and state ARARs for closure and post-closure of municipal landfills.
LONG-TERM EFFECTIVENESS AND PERMANENCE		
Magnitude of Residual Risk	Existing risks would remain: approximately 1.4 x 10 -4 excess cancer risk (ECR) and HI = 3.3 non-carcinogenic risks from exposure to site groundwater. Increased risk anticipated over time as landfill surface deteriorates.	Implementation and enforcement of institutional controls would reduce risks from exposure to site groundwater to less than 1 x 10 -6 ECR and HI less than 1.0. Over time, natural attenuation would result in permanently reduced risks. Installation and maintenance of the cap would reduce direct exposure risks to less than 1 x 10 -6 ECR and HI less than 1.0.
Adequacy and Reliability of Controls	No new controls implemented. Existing site features provide limited controls.	If properly maintained, the cap system would be reliable for preventing exposure and reducing contaminant migration to the environment. If implemented and enforced, institutional controls could prevent damage to the cap, intrusion into contaminated materials, and use of contaminated groundwater.
Need for 5-Year Review	Review would be required since soil and groundwater contaminants would be left in place.	Same as Alternative 1.
REDUCTION OF TOXICITY, MOBILITY, OR VOLUME THROUGH TREATMENT		
Reduction of Toxicity, Mobility, or Voume Through Treatment	No reduction, since no treatment would be employed.	Groundwater contamination eventually eliminated by natural attenuation.

TABLE 11
SITE 4 - COMPARATIVE ANALYSIS OF REMEDIAL ALTERNATIVES
NWS EARLE, COLTS NECK, NEW JERSEY

CRITERION:	ALTERNATIVE 1: NO ACTION	ALTERNATIVE 3: CAPPING, INSTITUTIONAL CONTROLS, NATURAL ATTENUATION, AND LONG-TERM MONITORING
SHORT-TERM EFFECTIVENESS		
Community Protection	No risk to community anticipated.	No significant risk to community anticipated. Engineering controls would be used during implementation to mitigate risks.
Worker Protection	No risk to workers anticipated if proper PPE is used during long-term monitoring.	No significant risk to workers anticipated if proper PPE is used during remediation and long-term monitoring
Environmental Impacts	No adverse impacts to the environment anticipated.	No significant impacts to the environment anticipated. Engineering controls would be used during implementation to mitigate risks.
Time Until Action is Complete	Not applicable.	1.5 years enhanced cap is in place. Natural attenuation will likely take longer.

TABLE 11
SITE 4 - COMPARATIVE ANALYSIS OF REMEDIAL ALTERNATIVES
NWS EARLE, COLTS NECK, NEW JERSEY

IMPLEMENTABILITY		
Ability to Construct and Operate	No construction or operation involved.	No difficulties anticipated. Capping is a readily implementable technology.
Ease of Doing More Action if Needed	Additional actions would be easily implemented if required.	If additional actions are warranted, the cover system may need to be opened to access contaminated materials within.
Ability to Monitor Effectiveness	Monitoring would provide assessment of potential exposures, contaminant presence, migration, or changes in site conditions.	Same as Alternative 1.
Ability to Obtain Approvals and Coordinate with Other Agencies	Coordination for 5-year reviews may be required and would be obtainable.	Coordination for 5-year reviews may be required and would be obtainable. Coordination with the state would be required to establish a CEA and would be obtainable.
Availability of Treatment, Storage Capacities, and Disposal Services	None required.	Same as Alternative 1.
Availability of Equipment, Specialists, and Materials	Personnel and equipment available for implementation of long-term monitoring and 5- year reviews,	Ample availability of equipment and personnel to construct cap and perform long-term maintenance, monitoring, and 5-year reviews.
Availability of Technology	Not required.	Common construction techniques and materials required for cap construction.
COST		
Capital Cost	$0	$1,983,000
First-Year Annual O&M Cost	$21,600	$29,600
Present Worth Cost*	$302,000	$2,400,000

* Present worth cost is based on discount rate of 7%.

Alternative 1 would not comply with state ARARs for attainment of groundwater quality standards (GWQS). Alternative 3 would comply by seeking a temporary exemption (CEA) from these requirements until the GWQS are achieved through natural attenuation.

3. Long-Term Effectiveness and Permanence

Alternative 3 would offer substantial long-term protection of human health and the environment. Under Alternative 1, risks would remain the same or potentially increase over time as the landfill surface continues to erode. Potential future users of site groundwater may be at risk under Alternative 1 because it lacks institutional controls that would prohibit use of untreated contaminated groundwater.

Alternative 3 would reduce human and ecological risks due to direct exposure to landfilled materials by placing a physical barrier to exposure. Long-term risks due to ingestion of site groundwater would be mitigated by reducing contaminant leaching into groundwater by installing the low-permeability cover system and by implementing institutional controls to prohibit use of untreated, contaminated groundwater.

4. Reduction of Toxicity, Mobility, or Volume Through Treatment

Because neither of the alternatives includes treatment, neither would reduce the toxicity, mobility, or volume through treatment. Alternative 3 would reduce the mobility of landfill contaminants by reducing precipitation infiltration.

5. Short-Term Effectiveness

The short-term effectiveness of the two alternatives would be similar. Engineering controls and personal protective equipment (PPE) would be expected to minimize potential adverse impacts to Base residents and personnel, the local community, and workers during implementation of Alternative 3.

Long-term monitoring, which would provide little opportunity for short-term impact, is the only on-site action proposed under Alternative 1. Alternative 3 would present a greater opportunity for short-term impact due to site preparation, grading, and constructing the cover system.

Impacts to the environment would be minimized under Alternative 3 by use of erosion and stormwater control measures during construction of the cover system.

Alternative 1 would not achieve any of the RAOs. Alternative 3 would achieve the RAO for prevention of direct contact with landfill contents upon completion of the cover system, within approximately 1.5 years. While the RAO for groundwater protection would not be immediately achieved, establishment of a CEA would eliminate potential use of groundwater in this area. Long-term periodic monitoring and analysis would determine when this RAO would be achieved.

6. Implementability

Alternative 1 is the most easily implemented since the only activities proposed are long-term monitoring and 5-year reviews. Alternative 3 would be more difficult to implement since it involves the construction of a cover system over several acres of land; however, no difficulties are anticipated, since common construction techniques are required and cover materials are available from several vendors.

If additional actions are warranted, they could be easily implemented under Alternative 1 or 3.

7. Cost

Alternative 1, No Action, would cost less to implement than Alternative 3.

No capital costs are associated with the no-action alternative. The estimated average annual operations and maintenance (O&M) cost for long-term periodic monitoring is $21,600 and 5-year reviews are $15,500 per event. Over a 30-year period, the estimated net present-worth cost is $302,000.

Estimated capital costs for Alternative 3 total $1,983,000. The average annual O&M costs are $29,600, and 5-year reviews cost $15,500 per event. Over a 30-year period, the estimated net present- worth cost is $2,400,000.

8. Agency Acceptance

The NJDEP has had the opportunity to review and comment on all the documents in the Administrative Record and has had the opportunity to comment on the draft ROD. Comments received from the NJDEP have been incorporated into the ROD.

9. Community Acceptance

The community has had the opportunity to review and comment on documents in the Administrative Record, has participated in regularly scheduled Restoration Advisory Board (RAB) meetings convened to encourage community involvement and a public meeting was held to provide the community an opportunity to learn about the Proposed Plan. The community has not indicated objections to the alternatives selected in this ROD. Part III, Responsiveness Summary, of this ROD presents an overview of community involvement and input to the selected alternative.

B. Site 5

Based on the initial screening of remedial alternatives, Alternatives 1 and 3 were retained for further consideration. A detailed review of Alternatives 1 and 3 is included in this section and summarized in Table 12.

1. Overall Protection of Human Health and the Environment

Only Alternative 3 would be protective of human health and the environment. Because no actions are conducted, Alternative 1 would not reduce human health or ecological risk and would not reduce contaminant migration to the environment. Health risks and the potential for adverse impacts to the environment are expected to remain the same over time.

Alternative 3 is protective of human health and the environment. The cover system would reduce human health and ecological risks posed by potential contact with landfilled materials and would reduce leaching of contaminants to groundwater, thereby reducing potential contaminant migration into the environment. Routine maintenance of the landfill cover system would ensure its long-term protectiveness. Institutional controls would provide assurance that untreated contaminated groundwater is not used as a potable water source in the future.

TABLE 12
SITE 5 - COMPARATIVE ANALYSIS OF REMEDIAL ACTION ALTERNATIVES
NWS EARLE, COLTS NECK, NEW JERSEY

CRITERION:	ALTERNATIVE 1: NO ACTION MONITORING	ALTERNATIVE 3: CAPPING, INSTITUTIONAL CONTROLS, NATURAL ATTENUATION, AND LONG-TERM
OVERALL PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT		
Prevent Human Exposure to Contaminated Landfill Soils and Materials	No action taken to prevent human exposure to landfilled materials. Existing risks would remain. Continued deterioration of the landfill surface, particularly the eastern portion, would expose more landfilled materials and result in increased direct exposure risks.	New cover system over eastern 1 acre of landfill and would prevent direct contact with contaminated materials. Existing soil/vegetative cover over western portion of landfill would limit direct contact with contaminated materials. Current direct contact risks were not quantified, but it is conservatively assumed that landfilled materials may pose excess health risk. Excess risks would be reduced by installing the new cap and maintaining the new and existing caps.
Prevent Human Exposure to VOC and Metal Contaminants in Groundwater	No action taken to prevent human exposure to contaminated groundwater. Carcinogenic and non-carcinogenic risks exceeding EPA's target risk range would remain. No actions taken to reduce contaminant leaching to groundwater. No institutional controls implemented to prohibit use of untreated groundwater for drinking water.	Institutional controls would minimize potential exposure to site groundwater by prohibiting its use. The enhanced cover system would reduce leaching of contaminants to groundwater, facilitating natural attenuation of contaminants. In time, contaminant concentrations would reach levels that would not pose excess risk.
Minimize Contaminant Migration to Groundwater	No actions taken to reduce contaminant leaching to groundwater. Contaminants would continue to leach into groundwater and migrate downgradient, potentially affecting downgradient receptors.	The enhanced cover system would reduce leaching of contaminants to groundwater and would reduce migration of contaminants to the environment by surface water and wind erosion.

TABLE 12
SITE 5 - COMPARATIVE ANALYSIS OF REMEDIAL ALTERNATIVES
NWS EARLE, COLTS NECK, NEW JERSEY

CRITERION:	ALTERNATIVE 1: NO ACTION	ALTERNATIVE 3: CAPPING, INSTITUTIONAL CONTROLS, NATURAL ATTENUATION, AND LONG-TERM MONITORING
COMPLIANCE WITH ARARs		
Chemical-Specific ARARs	Would not comply with state groundwater quality standards.	Groundwater contaminant concentrations would initially exceed state GWQC; over time GWQC would be achieved by natural attenuation. A classification exception area (CEA) would be established to provide the state official notification that standards would not be met for a specified duration.
Location-Specific; ARARs	Not Applicable.	Would comply with federal and state ARARs for wetlands, floodplains, and other sensitive receptors.
Action-Specific ARARs	Would not comply with federal or state ARARs for post-closure maintenance of municipal landfills.	Would comply with federal and state ARARs for closure and post-closure of municipal landfills.
LONG-TERM EFFECTIVENESS AND PERMANENCE		
Magnitude of Residual Risk	Existing risks would remain: approximately 1.3 x 10 -4 ECR and HI = 5.2 non-carcinogenic risks from exposure to site groundwater. Increased risk anticipated over time as landfill surface deteriorates, especially on eastern portion of landfill.	Implementation and enforcement of institutional controls would reduce risks from exposure to site groundwater to less than 1 x 10 -6 and HI less than 1.0. Over time, natural attenuation would result in permanently reduced risks. Installation of the new cap, maintenance of the new and existing caps, and implementation of access restrictions to prevent intrusion into contaminated materials would reduce direct exposure risks.
Adequacy and Reliability of Controls	No new controls implemented. Existing site features provide limited controls.	If properly maintained, the cap system would be reliable for preventing exposure and reducing contaminant migration to the environment. If implemented and enforced, institutional controls could prevent damage to the cap, intrusion into contaminated materials, and use of contaminated groundwater.

TABLE 12
SITE 5 - COMPARATIVE ANALYSIS OF REMEDIAL ALTERNATIVES
NWS EARLE, COLTS NECK, NEW JERSEY

CRITERION:	ALTERNATIVE 1: NO ACTION	ALTERNATIVE 3: CAPPING, INSTITUTIONAL CONTROLS, NATURAL ATTENUATION, AND LONG-TERM MONITORING
Need for 5-Year Review	Review would be required since soil and groundwater contaminants would be left in place.	Same as Alternative 1.
REDUCTION OF TOXICITY, MOBILITY, OR VOLUME THROUGH TREATMENT		
Reduction of Toxicity, Mobility, or Volume Through Treatment	No reduction, since no treatment would be employed	Groundwater contamination eventually eliminated by natural attenuation.
SHORT-TERM EFFECTIVENESS		
Community Protection	No risk to community anticipated.	No significant risk to community anticipated. Engineering controls would be used during implementation to mitigate risks.
Worker Protection	No risk to workers anticipated if proper PPE is used during long-term monitoring.	No significant risk to workers anticipated if proper PPE is used during cap construction and long-term monitoring.
Environmental Impacts	No adverse impacts to the environment anticipated.	No significant impacts to the environment anticipated. Engineering controls would be used during implementation to mitigate risks.
Time Until Action is Complete	Not applicable.	14 months until enhanced cap is in place. Natural attenuation will likely take longer.

TABLE 12
SITE 5 - COMPARATIVE ANALYSIS OF REMEDIAL ALTERNATIVES
NWS EARLE, COLTS NECK, NEW JERSEY

CRITERION:	ALTERNATIVE 1: NO ACTION	ALTERNATIVE 3: CAPPING, INSTITUTIONAL CONTROLS, NATURAL ATTENUATION, AND LONG-TERM MONITORING
IMPLEMENTABILITY		
Ability to Construct and Operate	No construction or operation involved.	No difficulties anticipated. Capping is a readily implementable technology.
Ease of Doing More Action if Needed	Additional actions would be easily implemented if required.	If additional actions are warranted in the eastern portion of the landfill, the single barrier cover system may need to be opened to access contaminated materials within. Additional actions would be easily implemented in the western portion of the landfill.
Ability to Monitor Effectiveness	Monitoring would provide assessment of potential exposures, contaminant presence, migration, or changes in site conditions.	Same as Alternative 1.
Ability to Obtain Approvals and Coordinate with Other Agencies	Coordination for 5-year reviews may be required and would be obtainable.	Coordination for 5-year reviews may be required and would be obtainable. Coordination with the state would be required to establish a CEA and would be obtainable.
Availability of Treatment, Storage Capacities, and Disposal Services	None required.	Same as Alternative 1.
Availability of Equipment, Specialists, and Materials	Personnel and equipment available for implementation of long-term monitoring and 5- year reviews.	Ample availability of equipment and personnel to construct cap and perform long-term maintenance, monitoring, and 5-year reviews.
Availability of Technology	Not required.	Common construction techniques and materials required for cap construction.
COST		
Capital Cost	$0	$588,000
First-Year Annual O&M Cost	$15,800	$18,600
Present Worth Cost*	$230,000	$852,000

* Present worth cost is based on discount rate of 7%.

2. Compliance with ARARs

Because Alternative 1 does not include any remedial actions, it would not comply with state and federal ARARs pertaining to post-closure of municipal landfills.

Alternative 3 would comply with these requirements since a cover system would be installed and a long-term maintenance and repair program would be implemented.

Both alternatives would comply with federal and state long-term monitoring requirements through periodic monitoring and evaluation of groundwater.

Initially, periodic monitoring would be performed on a quarterly basis. If parameters are stable or contaminant concentrations are found to be decreasing, then a reduced frequency of sampling would be warranted.

Alternative 1 would not comply with state ARARs for attainment of groundwater quality standards. However, Alternative 3 would comply by seeking a temporary exemption (CEA) from these requirements until the GWQS are achieved through natural attenuation.

3. Long-Term Effectiveness and Permanence

Alternative 3 offers long-term protection of human health and the environment. Because no additional actions would be taken under Alternative 1 to contain wastes and limit deterioration of the landfill surface, risks could increase over time if the landfill surface erodes or is damaged. Potential future users of site groundwater may be at risk under Alternative 1 because Alternative 1 lacks institutional controls that would prohibit use of untreated contaminated groundwater.

Alternative 3 would reduce human and ecological risks due to potential direct exposure to landfilled materials by placing a barrier to exposure. Long-term risks due to ingestion of site groundwater would be reduced by reducing contaminant leaching into groundwater and by implementing institutional controls to prohibit use of untreated, contaminated groundwater.

4. Reduction of Toxicity, Mobility, or Volume Through Treatment

Because neither of the alternatives includes treatment, neither would reduce the toxicity, mobility, or volume through treatment. Alternative 3 would reduce the mobility of landfill contaminants by reducing precipitation infiltration into the eastern portion of the landfill.

5. Short-Term Effectiveness

The short-term effectiveness of the two alternatives would be similar. Engineering controls and PPE would be expected to minimize potential adverse impacts to Base residents and personnel, the local community, and workers during implementation. Long-term monitoring, which would provide little opportunity for short-term impact is the only on-site activity proposed under Alternative 1. Alternative 3 would present a greater opportunity for adverse short-term impact due to site preparation, grading, and construction of the cover system.

Impacts to the environment are not anticipated under Alternative 1 since minimal activities would be implemented. Impacts to the environment would be minimized by implementing erosion and storm water control measures during cap construction under Alternative 3.

Alternative 1 would not achieve any of the RAOs. Alternative 3 would achieve the RAO for prevention of direct contact with landfill contents upon completion of the cover system, within approximately 1.5 years. While the RAO for groundwater protection would not be immediately achieved, establishment of a CEA would eliminate potential use of groundwater in this area. Long-term periodic monitoring and analysis would determine when this RAO would be achieved.

6. Implementability

Each of the alternatives would be implementable. Alternative 1 is the most easily implemented since the only activities proposed are long-term monitoring and 5-year reviews. Alternative 3 would be more difficult to implement since it involves the construction of a cover system over several acres of land; however, no difficulties are anticipated because covers are a commonly applied technology involving conventional construction methods and cover materials are available from several vendors.

If additional actions are warranted, they could be easily implemented under Alternative 1 or 3.

7. cost

Alternative 1, No Action, would cost less to implement than Alternative 3.

No capital costs are associated with the no-action alternative. The estimated average annual O&M cost for long-term periodic monitoring is $15,800 and 5-year reviews are $15,500 per event. Over a 30-year period, the estimated net present-worth cost is $230,000.

Estimated capital costs for Alternative 3 total $588,000. The average annual O&M costs are $18,600, and 5-year reviews cost $15,500 per event. Over a 30-year period, the estimated net present-worth cost is $852,000.

8. Agency Acceptance

The NJDEP has had the opportunity to review and comment on all the documents in the Administrative Record and has had the opportunity to comment on the draft ROD. Comments received from the NJDEP have been incorporated into the ROD.

9. Community Acceptance

The community has had the opportunity to review and comment on documents in the Administrative Record, has participated in regularly scheduled Restoration Advisory Board (RAB) meetings convened to encourage community involvement and a public meeting was held to provide the community an opportunity to learm about the Proposed Plan. The community has not indicated objections to the alternatives selected in this R0D. Part III, Responsiveness Summary, of this ROD presents an overview of community involvement and input to the selected alternative.

X. THE SELECTED REMEDY

A. Site 4

The Navy, with the support of EPA, in consultation with NJDEP has selected Alternative 3: Capping, Institutional Controls, and Long-Term Monitoring as the preferred alternative. This alternative is in compliance with the EPA presumptive remedy and includes a CEA as required by the state groundwater quality protection criteria. The CEA will cover the area immediately adjacent and (approximately 800 - 1,000 feet) downgradient of the landfill. Capping the landfill will inhibit infiltration of groundwater through the landfill, thus in time eliminating the groundwater contamination source (Figure 11). This alternative would mitigate the potential exposure scenarios, which are direct exposure to landfill contents and consumption of contaminated groundwater from site, and would be protective of human health and the environment.

By regrading the landfill surface to preclude erosion, placing a cap over the landfill surface to avoid potential direct contact with landfill contents, and establishing a formal CEA to bar the use of site groundwater during the remediation period, the Navy will reduce the unacceptable risks associated with Site 4. The preferred alternative is believed to provide the best balance of protection among the alternatives with respect to response criteria.

While the RAO for groundwater protection would not be immediately achieved, risks would be reduced in relation to background by the elimination of infiltration and continued monitoring to evaluate contaminant trends. Long-term periodic monitoring and analysis would determine when this RAO would be achieved. Long-term monitoring will be quarterly until such time as EPA and the Navy agree on a reduced schedule.

Based on available information, the Navy and EPA believe the preferred alternative would be protective of human health and the environment, would be cost effective, and would be in compliance with all statutory requirements of EPA, the state, and the local community.

B. Site 5

The Navy, with the support of EPA, in consultation with NJDEP has selected Alternative 3: Capping, Institutional Controls, and Long-Term Monitoring as the preferred alternative. This alternative is in compliance with the EPA presumptive remedy and includes a CEA as required by the state groundwater quality protection criteria. The CEA will cover the area immediately adjacent and (approximately 800 - 1,000 feet) downgradient of the landfill. Capping the landfill will inhibit infiltration of groundwater through the landfill, thereby in time eliminating the groundwater contamination source (Figure 12). This alternative would mitigate the potential exposure scenarios, which are direct exposure to landfill contents and consumption of contaminated groundwater from the site, and would be protective of human health and the environment.

By regrading the landfill surface where necessary to preclude erosion, placing a cap over the landfill surface to avoid potential direct contact with landfill contents, and establishing a formal CEA to bar the use of site groundwater during the remediation period, the Navy will reduce the unacceptable risks associated with Site 5. The preferred alternative is believed to provide the best balance of protection among the alternatives with respect to response criteria.

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While the RAO for groundwater protection would not be immediately achieved, risks would be reduced in relation to background by the elimination of infiltration and continued monitoring to evaluate contaminant trends. Long-term periodic monitoring and analysis would determine when this RAO would be achieved. Long-term monitoring will be quarterly until such time as EPA and the Navy agree on a reduced schedule.

Based on available information, the Navy and EPA believe the preferred alternative would be protective of human health and the environment, would be cost effective, and would be in compliance with all statutory requirements of EPA, the state, and the local community.

XI. STATUTORY DETERMINATIONS

The remedy selected for OU-1 satisfies the remedy selection requirements of CERCLA and the NCP. The remedy is expected to be protective of human health and the environment, complies with ARARs, and is cost effective. The following sections discuss how the selected remedial action addresses these statutory requirements.

A. Protection of Human Health and the Environment

1. Site 4

Alternative 3 would provide overall protection of human health and the environment by preventing direct exposure to contaminated landfill materials, reducing contaminant migration from the landfill into the environment and instituting restrictions on use of site groundwater.

Although the potential health risks from direct exposure to landfill contaminants were not quantified in the RI, it is conservatively assumed that direct exposure landfilled materials may pose health risks to humans and animals. These risks would be reduced by installation of an enhanced cover system over the landfill. Because the enhanced cover would effectively eliminate the direct exposure pathway, the direct

contact risks would be eliminated, provided that the cover was property maintained. The cover system would also prevent contaminant migration to the environment by surface runoff and wind erosion.

Alternative 3 would also reduce the risks posed by future use of site groundwater. The human health risk assessment concluded that site groundwater poses carcinogenic and non-carcinogenic risks exceeding EPA's target risk range under a future residential exposure scenario. Capping the landfill with a low-permeability cover system would significantly reduce infiltration of precipitation into the landfill, thereby reducing contaminant leaching from the landfill materials to the underlying groundwater and facilitating natural attenuation of groundwater contamination. Reducing leaching of contaminants from the landfill into the underlying groundwater will eventually result in a decrease of groundwater contaminant concentrations to acceptable levels (GWQS), reducing the long-term risk posed by future use of site groundwater. Modeling predicts that an estimated 55 feet downgradient of the site was the maximum distance where metals in groundwater would exceed either GWQS or background levels. Implementing access restrictions and establishing the site as a groundwater CEA would provide interim protection by prohibiting use of the aquifer until GWQS are achieved.

Fencing and access restrictions would provide additional long-term protection by limiting access to the capped area and restricting activities that could damage or intrude into the cover system and contaminated media.

The long-term periodic monitoring program would allow the responsible agency to monitor the quality of groundwater leaving the site, assess potential impacts to downgradient receptors, and determine whether additional remedial actions are necessary.

Use of engineering controls to minimize generation of fugitive dusts and vapors, and proper use of PPE by site workers would effectively minimize short-term risks to the local community and workers posed by implementation of this alternative.

2. Site 5

Alternative 3 would provide overall protection of human health and the environment by preventing direct exposure to contaminated landfill materials, reducing contaminant migration from the landfill into the environment, and instituting restrictions on use of site groundwater.

Although the potential health risks from direct exposure to landfill contaminants were not quantified in the RI, it is conservatively assumed that direct exposure to landfilled materials may pose health risks to humans and animals. Direct exposure risks would be reduced by installation of an enhanced cover system over the eastern side of the landfill and long-term inspection and maintenance of the entire landfill surface. Because the properly maintained cover system would effectively eliminate the direct exposure pathway, the direct contact risks would be eliminated by implementation of Alternative 3. The cover system would also prevent further erosion of the landfill surface and reduce contaminant migration to the environment by surface runoff and wind erosion.

Alternative 3 would also reduce the risks posed by future use of site groundwater. The human health risk assessment concluded that site groundwater poses carcinogenic and non-carcinogenic risks exceeding EPA's target risk range under a future residential exposure scenario. Capping the landfill with a low-permeability cover system would reduce infiltration of precipitation into the landfill, thereby reducing contaminant leaching from the landfill materials to the underlying groundwater and facilitating natural attenuation of groundwater contamination. Reducing leaching of contaminants from the landfill into the underlying groundwater will eventually result in a decrease of groundwater contaminant concentrations to acceptable levels (GWQS), reducing the long-term risk posed by future use of site groundwater. Implementing access restrictions and establishing the site as a groundwater CEA would provide interim protection by prohibiting use of the aquifer until GWQS are achieved.

Access restrictions would also provide additional long-term protection by limiting access to the capped area and restricting activities that could damage or intrude into the cover system and contaminated media.

The long-term monitoring program would allow the responsible agency to monitor the quality of groundwater leaving the site, assess potential impacts to downgradient receptors, and determine whether additional remedial actions are necessary.

Use of engineering controls to minimize generation of fugitive dusts and vapors and proper use of PPE by site workers would effectively minimize short-term risks to the local community and workers posed by implementation of this alternative.

B. Compliance With and Attainment of ARARs

The selected remedy for OU-1 will comply with all applicable or relevant and appropriate chemical-specific, location-specific, and acton-specific ARARs. Tables 13 through 18 summarize ARARs and TBCs applicable to OU-1.

TABLE 13
POTENTIAL FEDERAL CHEMICAL-SPECIFIC ARARs AND TBCs
NAVAL WEAPON STATION EARLE, COLTS NECK, NEW JERSEY

REQUIREMENT	STATUS	REQUIREMENT SYNOPSIS	COMMENTS
Safe Drinking Water Act (SDWA)-Maximum Contaminant Levels (MCLs)(40 CFR 141.11-141.16)	Potentially Relevant and Appropriate	MCLs have been promulgated for a number of common organic and inorganic contaminants to regulate the concentration of contaminants in public drinking water supply systems. MCLs may be relevant and appropriate for groundwater because the aquifer beneath the site is a potential drinking water supply.	MCLs may be used to establish clean-up levels for the portion of the aquifer underlying the OU-1 sites. MCLs can be used to derive potential soil cleanup levels.
Resource Conservation and Recovery Act (RCRA) - Groundwater Protection Standard (40 CFR 264.94)	Potentially Relevant and Appropriate	The RCRA groundwater protection standard is established for groundwater monitoring of RCRA permitted treatment, storage or disposal facilities. The standard is set at either an existing or proposed RCRA-MCL, background concentration, or an alternate concentration limit (ACL) protective of human health and the environment.	RCRA-MCLs may be used or ACLs may be developed to identify levels of contamination in the aquifer above which human health and the environment are at risk and to provide an indicator when corrective action is necessary.
RCRA Land Disposal Restrictions (40 CFR 268)	Potentially Applicable	Then regulations identify hazardous wastes that are restricted from land disposal and establish waste analysis and recordkeeping requirements and "treatment standards" (concentration levels or methods of treatment) that wastes must meet in order to be eligible for land disposal.	Contaminated soil must be analyzed and disposed in accordance with the requirements of these regulations. If necessary, soils will be treated to attain applicable "treatment standards" prior to placement in a landfill, or other land disposal facility. This requirement would be considered for alternatives involving land disposal.
Clean Water Act - Ambient Water Quality Criteria (AWQC)	To be Considered	AWQC are non-promulgated health-based surface water quality criteria that have been developed for carcinogenic and non-carcinogenic compounds for the protection of human health. AWQC have also been developed for the protection of aquatic organisms.	AWOC may be used to assess need for remediation of discharges to surface water, or to use as benchmarks during long-term monitoring

TABLE 13
POTENTIAL FEDERAL CHEMICAL-SPECIFIC ARARs AND TBCs
NAVAL WEAPON STATION EARLE, COLTS NECK, NEW JERSEY

REQUIREMIENT	STATUS	REQUIREMENT SYNOPSIS	COMMENTS
SDWA Maximum Contaminant Level Goals (MCLGs) (40 CFR 141.50 and 141.51)	To Be Considered	MCLGs are heath-based limits for contaminant concentrations in drinking water. MCLGs are established at levels at which no known or anticipated adverse effects on human health are anticipated and which allow for an adequate margin of safety. MCLGs are set without regard for cost or feasibility.	Non-zero MCLGs may be used as clean-up levels if conditions at the site justify setting cleanup levels lower than MCLs.
Revised Interim Soil Lead Guidance for CERCLA Sites and RCRA Corrective Action Facilities (OSWER Directive No.9355.4-12) (Jul 1994)	To Be Considered	This OSWER Directive recommends a lead soil screening level of 400 ppm for residential land use based on the IEUBK model. The screening value may be used to determine whether sites or portions of sites warrant further evaluation and evaluations of risks.	If any of the OU-1 sites is to be considered for eventual residential use, then the screening value may be used to assess whether site-specific and levels require further evaluation and possible remediation.
EPA Groundwater Protection Strategy	To Be Considered	Provides classification and restoration goals for groundwater based on its vulnerability, use, and value.	This strategy was considered in conjunction with the Federal SDWA and State Groundwater Protection Rules in order to determine groundwater cleanup levels.
Risk Based Concentration (RBC)	To Be Considered	RBCs are developed based on estimating a concentration in a specific media (i.e., air, water or soil) that is associated with specific exposure assumptions and a specific risk level (i.e., Hazard Quotient of 1 or a Cancer Risk of 1 X 10E -6). The selection of specific exposure parameters and risk levels also contribute to the calculated risk-based concentration.	RBCs may be used to develop clean-up goals based on human health criteria.

TABLE 13
POTENTIAL FEDERAL CHEMICAL-SPECIFIC ARARs AND TBCs
NAVAL WEAPON STATION EARLE, COLTS NECK, NEW JERSEY

REQUIREMENT	STATUS	REQUIREMENT SYNOPSIS	COMMENTS
EPA Health Advisories and Acceptable Intake Health Assessment Documents	To Be Considered	Intended for use in qualitative human health evaluation of remedial alternatives.	These advisories and health assessment documents were used in assessing health risks from contaminants present at the site.
Clean Air Act - Standards for Air Emissions from Municipal Solid Waste Landfills (40 CFR 60.752 and 60.753)	Potentially Relevant and Appropriate	Active landfills with design capacities equal to or greater than 2.5 million cubic meters are required to have landfill gas collection and control systems if greater than 50 megagrams of non-methane organic compounds are expected to be emitted. The collection system shall be operated so that the methane concentration is less than 500 ppm above background at the surface of the landfill.	Both Sites 4 and 5 landfills are estimated to be much less than 2 million cubic feet in capacity. However, soil gas studies and measurement of methane concentrations at the landfill surfaces need to be conducted during the pre-design phase to determine whether landfill gas controls need to be included as part of the control systems.

TABLE 14
POTENTIAL STATE CHEMICAL-SPECIFIC ARARs AND TBCs
NAVAL WEAPON STATION EARLE, COLTS NECK, NEW JERSEY

REQUIREMENT	STATUS	REQUIREMENT SYNOPSIS	COMMENTS
N.J.S.A 58:10B	Applicable	Establishes New Jersey's acceptable risk range of 10 E-6 (one cancer in a million).	New Jersey water quality standards and soil clean-up criteria are based on this risk level.
New Jersey Ground Water Quality Standards (GWQS) (N.J.A.C. 7:9-6)	Applicable	This regulation establishes the rules to protect ambient ground water quality through establishing groundwater protection and clean up standards, and setting numerical criteria limits for discharges to ground water. The Ground Water Criteria (GWQC) (N.J.A.C. 7:9-6.7) are the maximum allowable pollutant concentrations in ground water that are protective of human health. This regulation also prohibits the discharges to groundwater that subsequently discharges to surface water, which do not comply the Surface Water Quality Standards (SWQS).	Because contaminated groundwater is present underneath the OU-1 sites in excess of GWQS, ftse regulations will be considered in determining groundwater action levels. Application for Classification Exception Area (CEA) may be required if GWQS will not be met during the term of proposed remediation. The CEA procedure ensures that designated groundwater uses at remediation sites are suspended for the term of the CEA.
New Jersey Surface Water Ouality Standards (SWQS) (N.J.A.C. 7:9B)	Applicable	These standards establish rules to protect and enhance surface water resources, define surface water classifications and uses, establish water quality based criteria, and effluent discharge limitations. The Surface Water Criteria (SWQC) (N.J.A.C. 7:9B-14) are the maximum allowable pollulant concentrations in surface water for the designated use.	For alternatives where surface water may be affected, remedial measures may be needed so that the SWQC are attained in the long term. Remedial alternatives shall consider action to mitigate the continued contamination of surface waters.
New Jersey Safe Drinking Water Act (N.J.A.C. 7:10)	Potentially Relevant and Appropriate	These regulations were promulgated to assure the provision of safe drinking water to consumers in public community water systems. Maximum Contaminant Levels (MCLs)(N.J.A.C. 7: 10-16) have been established to regulate the concentration of organic and metal contaminants in water supplies. MCLs may be relevant and appropriate for groundwater because the aquifer beneath the site is a potential drinking water supply.	MCLs may be used to establish clean-up levels for groundwater underlying the OU-1 sites. MCLs can be used to derive potential soil cleanup levels.

TABLE 14
POTENTIAL STATE CHEMICAL-SPECIFIC ARARS AND TBCS
NAVAL WEAPON STATION EARLE, COLTS NECK, NEW JERSEY

REQUIREMENT	STATUS	REQUIREMENT SYNOPSIS	COMMENTS
New Jersey Soil Cleanup Criteria	To Be Considered	These are non-promulgated soils cleanup criteria for residential direct contact, non-residential direct contact, and impact to ground water (through leaching).	These criteria will be considered in the development of soil cleanup goals.

TABLE 15
POTENTIAL FEDERAL LOCATION-SPECIFIC ARARs AND TBCs
NAVAL WEAPON STATION EARLE, COLTS NECK, NEW JERSEY

REQUIREMENT	STATUS	REQUIREMENT SYNOPSIS	COMMENTS
Wetlands Executive Order (E.O. 11990)& 40 CFR 6, App. A (Policy on Implementing E.O. 11990)	Potentially Applicable	Federal agencies are required to minimize the destruction, loss, or degradation of wetlands, and preserve and enhance natural and beneficial values of wetlands.	Remedial alternatives that involve excavation or deposition of materials will include all practicable means of minimizing harm to the wetlands adjacent to the OU-1 sites. Wetlands protection consideration will be incorporated into the planning, decision-making, and implementation of remedial alternatives.
Floodplains Executive Order(E.O. 11988) & 40 CFR 6, App. A (Policy on Implementing E.O. 11988)	Potentially Applicable	Federal agencies are required to reduce the risk of flood loss, minimize impact of floods, and restore and preserve the natural and beneficial value of floodplains.	The potential effects on floodplains will be considered during the development and evaluation of remedial alternatives. practicable measures will be taken to minimize adverse effects on floodplains.
Resource Conservation and Recovery Act (RCRA) Location Standards, Floodplains (40 CFR 264.18 (a))	Potentially Applicable	Any RCRA facility that treats, stores, or disposes of hazardous waste, if situated in a 100-year floodplain, must be designed, constructed, operated, and maintained to avoid washout.	Where possible, remedial alternatives that include construction of a treatment, storage, or disposal facility will be sited outside of a 100-year floodplain.
Endangered Species Act of 1973 (16 USC 1531 et seq.); (50 CFR Part 200)	Potentially Applicable, if present	Actions shall be taken to conserve endangered or threatened species, or to protect critical habitats. Consultation with the Department of the Interior is required.	The RI determined that there were no sensitive habitats (except for wetlands), endangered or threatened species present at the OU-1 sites.
Fish and Wildlife Coordination Act Of 1958 (16 U.S.C. 661) Protection of Wildlife Habitats	Potentially Applicable	This regulation requires that any Federal agency that proposes to modify a body of water must consult with the U.S. Fish and Wildlife Service, and requires that actions be taken to avoid adverse effects, minimize potential harm to fish or wildlife, and to preserve natural and beneficial uses of the land.	During the evaluation of alternatives, potential remediation effects on the wetlands and floodplains are evaluated. If it is determined that an impact may occur, then the U.S. Fish and Wildlife Service, the NJDEP, and EPA would be consulted.

TABLE 15
POTENTIAL FEDERAL LOCATION-SPECIFIC ARARs AND TBCs
NAVAL WEAPON STATION EARLE, COLTS NECK, NEW JERSEY

REQUIREMENT	STATUS	REQUIREMENT SYNOPSIS	COMMENTS
National Historic Preservation Act of 1966 Section 106 (16 USC 470 et. seq.)	Potentially Applicable, if present	Action will be taken to recover and to preserve historic artifacts that may be threatened as the result of terrain alteration.	Potential ARAR if artifacts are encountered during active site remediation (e.g excavation, consolidation, grading). To date, no such artifacts have been encountered at the OU-1 sites.
National Archeological and Historic Preservation Act of 1974 (132 CFR 229)	Potentially Applicable, if present	Action will be taken to recover and to preserve scientific, prehistoric, historic, or archaeologic artifacts that may be threatened as the result of	Potential ARAR if artifacts are encountered during active site remediation (e.g. excavation, consolidation,grading}. terrain alteration.
To date, no such atifacts have been encountered at the		OU-1 sites.	

TABLE 16
POTENTIAL STATE LOCATION-SPECIFIC ARARs AND TBCs
FEASIBILITY STUDY
NAVAL WEAPON STATION EARLE, COLTS NECK, NEW JERSEY

REQUIREMENT	STATUS	REQUIREMENT SYNOPSIS	COMMENTS
New Jersey Freshwater Wetlands Protection Act Rules (N.J.A.C 7:7A)	Potentially Applicable	Regulate activities that result in the disturbance in and around fresh water wetland areas including: removing of dredging wetland soils, disturbing the water level or water table, driving piles, placing of obstructions, destroying plant life, and discharging dredged or fill materials into open water.	Remedial alternatives will be developed to avoid activities that would be detrimental to the wetlands located adjacent to the OU-1 sites.
New Jersey Freshwater Wetlands Protection Act Rules, Mitigation (N.J.A.C. 7:7A-14)	Potentially Applicable	This regulation requires mitigation of the disturbed wetlands or filled open water. Generally requires the restoration, creation, or enhancement of area, or donations to the Mitigation Bank, of equal ecological value.	If a remedial alternative action results in the loss of wetlands through dredging, filling, or construction activities, then mitigation measures will need to be incorporated into the alternative's design.
New Jersey Flood Hazard Area Control (N.J.A.C. 7:14)	Potentially Applicable	These regulations control development in floodplains and water courses that may adversely affect the flood-carrying capacity of these features, subject new facilities to flooding, increase storm water runoff, degrade water quality, or result in increased sedimentation, erosion, or environmental damage.	This requirement is applicable to remedial alternative actions that may adversely affect floodplains adjacent to the OU-1 sites.
New Jersey Siting Criteria for New Major Commercial Hazardous Waste Facilities (N.J.A.C. 7:26-13)	Potentially Relevant and Appropriate	These regulations specify siting requirements and limitations for commercial hazardous waste facilities including protection of nearby residents, surface water, groundwater, air, and environmentally sensitive areas.	If remedial alternative employs an on-site or on-base treatment of contaminated soils, sediments, or materials, then remediation activities will need to be consistent with these requirements.

TABLE 17
POTENTIAL FEDERAL ACTION-SPECIFIC ARARs AND TBCs
NAVAL WEAPON STATION EARLE, COLTS NECK, NEW JERSEY

REQUIREMENT	STATUS	REQUIREMENT SYNOPSIS	CONSIDERATION IN THE FS
Resource Conservation and Recovery Act (RCRA) - Hazardous Waste Generator and Transporter Requirements (40 CFR parts 262 and 263)	Potentially Applicable	These regulations establish the responsibilities of generators and transporters of hazardous waste in the handling, transportation, and management of waste. The regulations specify the packaging, labeling, recordkeeping, and manifest requirements.	Activities performed in connection with off-site transport of hazardous wastes will comply with the requirements of these regulations.
RCRA - General Facility Standards (40 CFR 265 Subpart B)	Potentially Applicable	General facility requirements outline general waste analysis, security measures, inspections, and training requirements.	If a remedial alternative includes the establishment of an on-base treatment facility for hazardous wastes (characterisitic or listed), then this regulation will be considered. This regulation specifies TSD facilities construction, fencing, postings, and operations. All workers will be property trained. Process wastes will be evaluated for the characteristics of hazardous wastes to assess further handling requirements.
RCRA - Preparedness and Prevention (40 CFR 265 Subpart C)	Potentially Applicable	Outlines requirements for safety equipment and spill control.	If a remedial alternative includes treatment, storage, or disposal of hazardous wastes, then this regulation will be considered. Safety and communication equipment will be maintained at the site. Local authorities will be familiarized with the site operations.
RCRA - Contingency Plan and Emergency Procedures (40 CFR 265 Subpart D)	Potentially Applicable	Outlines requirements for emergency procedures to be used following explosions, fires, etc.	If the alternative includes treatment, storage, or disposal of hazardous wastes, then contingency plans will be developed. Copies of the plans will be kept on-site.
RCRA - Manifesting Recordkeeping, and Reporting (40 CFR 265 Subpart E)	Potentially Applicable	Specifies the recordkeeping and reporting requirements for RCRA facilities.	If the alternative includes treatment, storage, or disposal of hazardous wastes, then records of facility activities will be developed and maintained during remedial actions.

TABLE 17
POTENTIAL FEDERAL ACTION-SPECIFIC ARARs AND TBCs
NAVAL WEAPON STATION EARLE, COLTS NECK, NEW JERSEY

REQUIREMENT	STATUS	REQUIREMENT SYNOPSIS	COMMENTS
RCRA - Closure and Post-Closure (40 CFR 258, Subpart F)	Potentially Relevant and Appropriate	Details specific requirements for closure and pos-closure of municipal solid waste landfills. Final cover requirements that address minimizing infiltration and erosion are identified in this regulation. Following closure, post-dosure requirements include preparing a post-closure plan, maintaining integrity and effectiveness of the final cover, groundwater monitoring, and maintaining and operating a gas collection system.	If an alternative includes closure of a solid waste landfill, then these requirements will be considered in formulating the alternative.
RCRA - Land Treatment (40 CFR 265 Subpart M)	Potentially Applicable	These regulations detail the requirements for conducting land treatment of RCRA hazardous waste.	Alternative that involve on-site treatment of hazardous wastes (contaminated soil or sediments) will comply with these regulations.
RCRA - Thermal Treatment (40 CFR 265 Subpart P)	Potentially Applicable	This regulation details operating requirements and performance standards for thermal treatment of hazardous wastes.	Alternative that include thermal or catalytic oxidation of offgases. would be designed and operated in compliance with this regulation.
RCRA - Miscellaneous Treatment Units (40 CFR 264 Subpart X)	Potentially Applicable	This regulation details design and operating standards for units in which hazardous waste is treated.	Hazardous waste treatment units used for on-site or on-base treatment of contaminated media must meet these requirements.
RCRA - Air Emission Standards for Process Vents (40 CFR 265 Subpart AA)	Potentially Applicable	This regulation contains air pollutant emission standards for process vents, closed-vent systems, and control devices at hazardous waste TSD facilities. This subpart applies to equipment associated with solvent extraction or air/steam identified or listed RCRA hazardous wastes and have a total organics concentration of 10 ppm or greater.	These standards will be considered during the development and design of alternatives that include treatment of VOC-contaminated soils. Air emissions from treatment units will be monitored to ensure compliance with this ARAR. stripping operations that treat wastes that are

TABLE 17
POTENTIAL FEDERAL ACTION-SPECIFIC ARARs AND TBCs
NAVAL WEAPON STATION EARLE, COLTS NECK, NEW JERSEY

REQUIREMENT	STATUS	REQUIREMENT SYNOPSIS	COMMENTS
OSWER Directive 9355.0-62FS Application of the CERCLA Municipal Landfill Presumptive Remedy to Military Landfills (interim Guidance)(April 1996)	To Be Considered	This EPA directive provides guidance in evaluating military landfill sites and determining whether presumptive remedies can be applied.	The procedures and suggested remedial actions will be considered in formulating remedial alternative for Sites 4 and 5.
OSWER Directive 9355.0-49FS Presumptive Remedy for CERCLA Municipal Landfill Sites (Sep 1993)	To Be Considered	This EPA directive provides guidance in evaluating CERCLA municipal landfill sites and determining if presumptive remedies can be applied.	The procedures and suggested remedial actions will be considered in formulating remedial alternatives for Sites 4 and 5.

TABLE 18
POTENTIAL STATE ACTION-SPECIFIC ARARS AND TBCs
NAVAL WEAPON STATION EARLE, COLTS NECK, NEW JERSEY

REQUIREMENT	STATUS	REQUIREMENT SYNOPSIS	COMMENTS
New Jersey Labeling, Records, and Transportation Requirements (N.J.A.C. 7:26-7)	Potentially Applicable	These regulations establish the responsibilities of generators and transporters of hazardous waste in the handling, transportation, and management of waste. The regulations specify the packaging, labeling, recordkeeping, and manifest requirements.	Activities performed in connection with off-site transport of hazardous wastes will comply with the requirements of these regulations.
New Jersey Requirements for Hazardous Waste Facilities (N.J.A.C. 7:26-9)	Potentially Applicable	These regulations identify requirements for facilities in general, groundwater monitoring, preparedness and prevention, contingency and emergency procedures, and general closure and post-closure.	If a remedial alternative includes the establishment of an on-base treatment facility for contaminated soils and materials, then this regulation will be complied with during implementation.
New Jersey Closure and Post-Closure Care of Sanitary Landfills Regulations (N.J.A.C. 7:26-2A.9)	Potentially Relevant and Appropriate	Details specific requirements for closure and pos-closure of municipal solid waste landfills. Final cover requirements that address minimizing infiltration and erosion are identified in this regulation. Following closure, post-closure requirements include preparing a post-closure plan, maintaining integrity and effectiveness of final cover, groundwater monitoring, and maintaining and operating a gas collection system.	If an alternative includes closure of a solid waste landfill, then these requirements will be considered in formulating the alternative.
New Jersey Thermal Treatment Regulations (N.J.A.C. 7:26-11.6)	Potentially Applicable	These regulations detail operating requirements, waste analyses and monitoring of treatment conditions, performance standards, and closure of existing facilities that thermally treat hazardous wastes.	Alternatives that include thermal treatment of contaminated soils, sediments, and materials would be designed and operated in consistent with this regulation.

TABLE 18
POTENTIAL STATE ACTION-SPECIFIC ARARs AND TBCs
NAVAL WEAPON STATION EARLE, COLTS NECK, NEW JERSEY

REQUIREMENT	STATUS	REQUIREMENT SYNOPSIS	COMMENTS
New Jersey Chemical, Physical, and Biological Treatment Regulations (N.J.A.C. 7:26-11.7)	Potentially Applicable	These regulations detail operating requirements, waste analyses and monitoring of treatment conditions, and closure of existing facilities that physically, chemically, or biologically treat hazardous wastes. Also governs handling and compatibility of wastes in treatment processes.	Alternatives that include physical, chemical, or biological treatment of contaminated soils, sediments, and materials would be designed and operated in consistent with this regulation.
New Jersey Control and Prohibition of Air Pollution by Toxic Substances	Potentially Applicable if emissions	These regulations govern the emission of Group I and Group II toxic volatile organic compounds (TXS) to the ambient air. Group I TXS would be addressed through adequate stack TXS would be addressed through reasonably available control technology.	Alternatives that may result in the release of Group I or Group II TXS to the ambient air, exceeding 0.1 lb/hr, would incorporate appropriate vapor control measure to comply with these 45.4 g/hr height(0.1b/hr) or prevention of aerodynamic downwash. Group II requirements.

1. Chemical-Specific ARARs

Potential federal and state chemical-specific ARARs are listed in Tables 13 and 14, respectively.

a. Site 4

Implementation of Alternative 3 would comply with the ARARs identified in Tables 13 and 14. Because Alternative 3 does not include active treatment of groundwater, initially the groundwater beneath Site 4 would not meet the constituent concentrations specified in the New Jersey GWQS [N.J.A.C 7:9-6]. However, capping the landfill as proposed under Alternative 3 would reduce migration of contaminants into groundwater, facilitating natural attenuation of contaminants and ultimately resulting in attainment of GWQS. Alternative 3 includes a provision to seek a temporary exemption (CEA) from these requirements until the GWQS are achieved through natural attenuation. The CEA would be established to provide the state official notice that the constituent standards would not be met for a specified duration and to ensure that consumption of the untreated groundwater is prohibited.

b. Site 5

Because Alternative 3 does not include active treatment of groundwater, initially the groundwater beneath Site 5 would not meet the constituent concentrations specified in the New Jersey GWQS [N.J.A.C. 7:9-6]. However, capping the landfill as proposed under Alternative 3 would reduce migration of contaminants into groundwater, facilitating natural attenuation of contaminants and ultimately resulting in attainment of constituent standards. Alternative 3 includes a provision to seek a temporary exemption (CEA) from these requirements until the GWQS are achieved through natural attenuation. The CEA would be established to provide the state official notice that the constituent standards would not be met for a specified duration and to ensure that consumption of the untreated groundwater is prohibited.

2. Location-Specific ARARs

Potential federal and state location-specific ARARs are listed in Tables 15 and 16, respectively.

a. Site 4

The potential effects of the proposed remediation on wetlands, floodplains, water bodies, and other sensitive receptors would be identified during the design of Alternative 3 and all necessary measures would be taken to comply with the location-specific federal and state ARARs identified in Tables 15 and 16. It is expected that Alternative 3 would easily comply with these ARARs.

b. Site 5

The potential effects of the proposed remediation on wetlands, floodplains, water bodies, and other sensitive receptors would be identified during the design of Alternative 3 and all necessary measures would be taken to comply with the location-specific federal and state ARARs identified in Tables 15 and 16. It is expected that Alternative 3 would easily comply with these ARARs.

3. Action-Specific ARARs

Potential federal and state action-specific ARARs are listed in Tables 17 and 18, respectively.

8. Site 4

The single barrier cover system and long-term monitoring and maintenance plan proposed under Alternative 3 would comply with federal and state municipal landfill closure and post-closure regulations [40 CFR 258.60 & 258.61 and N.J.A.C. 7:26-2A.9.

b. Site 5

The single barrier cover system and long-term monitoring and maintenance plan proposed under Alternative 3 would comply with federal and state municipal landfill closure and post-closure regulations [40 CFR 258.60 & 258.61 and N.J.A.C. 7:26-2A.9].

4. To Be Considered (TBC} Standards

Office of Solid Waste and Emergency Response (OSWER) Directive 9355.0-62FS "Application of the CERCLA Municipal Landfill Presumptive Remedy to Military Landfills" (April 1996) and OSWER Directive 9355.0-49FS "Presumptive Remedy for CERCLA Municipal Landfill Sites" (September 1993) were used to develop remedial alternatives for OU-1.

C. Cost-Effectiveness

The Navy and EPA have determined that the selected remedy for OU-1 is cost effective in that it mitigates the risks posed by the site-related contaminants, meets all other requirements of CERCLA, and affords overall effectiveness proportionate to the cost. The estimated costs for the selected remedy for OU-1 are summarized below.

1. Site 4

The capital costs for Alternative 3 total $1,983,000. The average annual O&M costs are $29,600, and 5-year reviews cost $15,500 per event. Over a 30-year period, the net present-worth cost is $2,400,000 (at a seven percent discount rate).

2. Sits 5

The capital costs for Alternative 3 total $588,000. The average annual O&M costs are $18,600, and 5-year reviews cost $15,500 per event. Over a 30-year period, the net present-worth cost is $852,000 (at a seven percent discount rate).

D. Utilization of Permanent Solutions and Alternative Treatment Technologies to the Maximum Extent Practicable

The Navy and EPA have determined that the selected remedy represents the maximum extent to which permanent solutions and treatment technologies can be utilized in a cost effective manner at OU-1.

E. Preference for Treatment as a Principal Element

The Navy and EPA have determined that the selected remedy represents the maximum extent to which permanent solutions and treatment technologies can be utilized in a cost effective manner at OU-1.

XIII. DOCUMENTATION OF SIGNIFICANT CHANGES

No significant changes from the Proposed Plan appear in this ROD. The actual cost of capping sites 4 and 5 will depend on delineation of the former fill area at both sites during design.

RECORD OF DECISION

NAVAL WEAPONS STATION EARLE

OPERABLE UNIT 1

PART III - RESPONSIVENESS SUMMARY

The purpose of this Responsiveness Summary is to review public response to the Proposed Plan for OU-1.

It also documents the consideration of comments during the decision-making process and provides answers to any comments raised during the public comment period.

The Responsiveness Summary for OU-1 is divided into the following sections:

- Overview - This section briefly describes the remedial alternative recommended in the Proposed Plan and any impacts on the Proposed Plan due to public comment.
- Background on Community Involvement - This section describes community relations activities conducted with respect to the area of concern.
- Summary of Major Questions and Comments - This section summarizes verbal and written comments received during to public meeting and public comment period.

I. OVERVIEW

This Responsiveness Summary addresses public response to the Proposed Plan. The Proposed Plan and other supporting information were maintained for public review in the Administrative Record file for OU-1, which was maintained at the Monmouth County Library (Eastern Branch) in Shrewsbury, New Jersey.

II. BACKGROUND ON COMMUNITY INVOLVEMENT

This section provides a brief history of community participation in the investigation and interim remedial planning activities conducted for OU-1. Throughout the investigation period, EPA and the NJDEP have been reviewing work plans and reports and have been providing comments and recommendations, which were incorporated into appropriate documents. A Technical Review Committee (TRC), consisting of representatives from the Navy, EPA, the NJDEP, the Monmouth County Health Department, and other agencies and local groups surrounding NWS Earle, was formed. The TRC later was transformed into the Restoration Advisory Board (RAB) to include community members as well as the original officials from the TRC, and has been holding periodic meetings to maintain open lines of communication with the community and to inform all parties of current activities.

On April 18, 20, and 21, 1997, a newspaper notification inviting public comment on the Proposed Plan appeared in the Asbury Park Press. The public notice summarized tha Proposed Plan and the preferred alternative. The announcement also identified the time and location of the public meeting and specified a public comment period as well as the address to which written comments could be sent. Public comments were accepted from March 21, 1997 to April 30, 1997. The newspaper notification also identified the Monmouth County Library as the location of the Administrative Record.

The public meeting was hold on April 24, 1997 from 7:00 p.m. to 9:00 p.m. at the Colts Neck Courthouse in the Colts Neck Municipal Building, Cedar Drive, Colts Neck, New Jersey. At this meeting, representatives from the Navy, EPA, and the NJDEP were available to answer questions concerning OU-1 and the preferred alternative. The complete attendance list is included in Appendix B.

III. SUMMARY OF MAJOR QUESTIONS AND COMMENTS

A. Written Comments

During the public comment period from March 21 to April 30, 1997, no written comments were received from the public pertaining to OU-1. No new comments were received from the NJDEP or EPA.

B. Public Meeting Comments

One comment concerning OU-1 was received at the April 24, 1997 public meeting. Mr Lester Jargowsky stated that the Monmouth County Health Department concurred with the Proposed Plan for Sites 4 and 5.

Appendix A
TERMS USED IN THE RECORD OF DECISION

1,2-Dichloroethene (1,2-DCE): Common volatile organic solvent formerly used for cleaning, degreasing, or other uses in commerce and industry.

Applicable or Relevant and Appropriate Requirements (ARARs): The federal and state requirements that a selected remedy must attain. These requirements may vary among sites and remedial activities.

Administrative Record: An official compilation of site-related documents, data, reports, and other information that are considered important to the status of and decisions made relative to a Superfund site. The public has access to this material.

Carcinogenic: A type of risk resulting from exposure to chemicals that may cause cancer in one or more organs.

Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA): A federal law passed in 1980 and modified in 1986 by the Superfund Amendments and Reauthorization Act (SARA). The Act created a trust fund, known as Superfund, to investigate and clean up abandoned or uncontrolled hazardous substance facilities.

Feasibility Study (FS): Report identifying and evaluating alternatives for addressing the contamination present at a site or group of sites.

Groundwater Quality Standards (GWQS): New-Jersey-promulgated groundwater quality requirements, N.J.A.C. 7:9-6.

Hazard Index (HI): The sum of chemical-specific Hazard Quotients. A Hazard Index of greater than 1 is associated with an increased level of concern about adverse non-cancer health effects.

Harard Quotient (HQ): A comparison of the level of exposure to a substance in contact with the body per unit time to a chemical-specific Reference Dose to evaluate potential non-cancer health effects. Exceedence of a Hazard Quotient of 1 is associated with an increased level of concern about adverse non-cancer health effects.

Initial Assessment Study (IAS): Preliminary investigation usually consisting of review of available date and information of a sits, interviews, and a non-sampling site visit to observe areas of potential waste disposal and migration pathways.

Land Disposal Restrictions (LDRs): A set of EPA-prescribed limit concentrations with associated treatment standards regulating disposal in landfills.

Maximum Contaminant Level (MCL): EPA-published (promulgated as law) maximum concentration level for compounds found in water in a public water supply system.

Noncarcinogenic: A type of risk resulting from the exposure to chemicals that may cause systemic human health effects.

National Contingency Plan (NCP): The basis for the nationwide environmetal restoration program known as Superfund; administered by EPA under the direction of to U.S. Congress.

National Priorities List (NPL): EPA's list of the nation's top priority hazardous substance disposal facilities that may be eligible to receive federal money for response under CERCLA.

Presumptive Remedy: Preferred technologies for common categories of sites based on historical, patterns of remedy selection and EPA's scientific and engineering evaluation of performance data on technology implementation. Presumptive remedies, ensure the consistent selection of remedial actions.

RCRA Subtitle D facility: Municipal-type waste disposal facility (landfill} regulated by the Resource Conservation and Recovery Act (RCRA).

Record of Decision (ROD): A legal document that describes the remedy selected for a Superfund facility, why the remedial actions was chosen and others not, how much they are expected to cost, and how the public responded.

Reference Dose (RD): An estimate (with an uncertainty spanning an order of magnitude or greater) of a dally exposure level for the human population, including sensitive subpopulations, that is likely to be without an appreciable risk of deleterious effects during a lifetime.

Remedial Action Objective (RAO): An objective selected in the FS, against which all potential remedial actions are judged.

Remedial Investigation (RI): Study that determines the nature and extent of contamination at a site.

Site Inspection (SI): Sampling investigation with the goal of identifying potential sources of contamination, types of contaminants, aNd potential migration of contaminants. The SI is conducted prior to the RI.

Semivoiatile Organic Compounds (SVOCs): Organic chemicals [e.g., phthalates or polycyclic aromatic hydrocarbons (PAHs)] that do not readily evaporate under atmospheric conditions.

Target Compound List/Target Analyte List (TCL/TAL): List of routine organic compounds (TCL) or metals (TAL) included in the EPA Contract Laboratory Program.

Toxicity Characteristic Leaching Procedure (TCLP): Analytical test prescribed by EPA to determine potential leachate toxicity in materials; commonly used to determine the suitability of a waste for disposal in a landfill.

Trichloroethene (TCE}: Common volatile organic solvent formerly used for cleaning, degreasing, or other uses in commerce and industry.

Volatile Organic Compounds (VOCs): Organic liquids [e.g., vinyl chloride or trichloroethene (TCE)] that readily evaporate under atmospheric conditions.

APPENDIX B
ATTENDANCE LIST
APRIL 24, 1997 PUBLIC MEETING

NAME	ORGANIZATION
Gregory J. Goepfert	NWS Earle
John Kolicius	Novel Facilities Engineering Command
Gus Hermanni	NWS Earle
Kevin M. Bova	NWS Earle
Deborah Sciascia	NWS Earle
Russell Turner	Brown & Root Environmental
Jeffrey Gratz	USEPA Region II
Robert Marcolina	NJDEP
Barbara Douglas	Naval Facilities Engineering Command
Thomas Wiseman	NWS Earle
Lester Jargowsky	Monmouth County Health Department
Greta Deirocini	Navel Facilities Engineering Command
Angela Mazzioo	Student

ROD FACT SHEET

SITE	
Name	Naval Weapons Station Earle
Location/State	Monmouth County, New Jersey
EPA Region	II
HRS Score (date)	37 (08/30/90)
Site ID #	NJ0170022172
ROD	
Date Signed	September 25, 1997
Remedy/ies	Impermeable caps with long-term monitoring
Operable Unit	OU-1
Capital cost	Landfill 4 - $1,983,000 Landfill 5 - $588,000
Construction Completion	Landfill 4 - 1.5 years Landfill 5 - 1.5 years
O & M	Landfill 4 - $29,600 Landfill 5 - $18,600
Estimated Cost	Landfill 4 Present worth Cost (based on a discount rate of 7%) - $2,400,00 Landfill 5 Present Worth Cost (based on a discount rate of 7%) - $852,000
LEAD	
Remedial/Enforcement	Federal Facility
EPA/State/PRP	Navy
Primary contact (phone)	Sharon Jaffess 212-637-4396
Secondary contact (phone)	Robert Wing 212-637-4332
Main PRP(s)	Navy
PRP Contact (phone)	John Kolicius 610-595-0567 ext. 157
WASTE	
Type (metals, PCB, etc.)	Primarily household trash from base housing and construction debris. Low levels of volatile organic compounds detected immediately downgradient of the landfills.
Medium (soil, g.w.,etc.)	Landfill (soil) and ground water
Origin	Household trash from base housing and construction debris.
Est. quantity	Landfill 4 is 5 acres and received approximately 10,200 tons of waste from 1943 to 1960. Landfill 5 is 3 acres in size and received approximately 6,600 tons of waste from 1968 to 1978.